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GOVERNMENT REPORTS

Announcements & Index

Volume 80, Number 22 October 24, 1980

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* Committee on Scientific and Technical Information

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SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcateogry
NTIS order number Availability/Price codes
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Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A086 669/9 PC **A03**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
An Analytical Solution of Lift Loss for a Round Planform with a Central Lifting Jet.
Technical rept.,
K. T. Yen. 10 Mar 80, 36p Rept no. NADC-80057-60

An analysis of the lift for a round planform fitted with a centrally-located round jet is presented. The pressure distribution over the lower surface of the planform is solved analytically by matching an inner viscous solution with an outer potential solution. By comparing the calculated pressure distributions with NACA experimental data, satisfactory agreement has been obtained, although the planforms are not exactly the same. In addition, Wyatt's formula for the lift loss is found to be essentially valid, but only under limited conditions, and an improved formula is suggested. Additional works, both experimental and theoretical, needed to solve the lift loss problem are discussed with recommendations. (Author)

AD-A086 799/4 PC **A03**/MF **A01**
Dayton Univ OH Research Inst
Simulation of Viscous Steady Flow Past An Arbitrary Two-Dimensional Body.
Final rept. Aug 79-Jan 80,
Michele Napolitano. Feb 80, 46p AFWAL-TR-80-3038
Contract F33615-76-C-3145

A numerical technique is developed for solving laminar steady flow past an arbitrary two-dimensional body. A system of body oriented coordinates is first generated numerically by means of the transformation of Thompson et al. The vorticity-stream function Navier-Stokes equations are then solved by-the Alternating Direction Implicit procedure of Douglas and Gunn. A relaxation-like time derivative is added to the stream function equation and the vorticity equation is linearized in time so that only the converged steady solution has physical meaning. Numerical results are presented for two model problems (a one dimensional Poiseuille flow

and the driven cavity problem) and for flow past a NACA 0012 airfoil for moderate to high values of the Reynolds Number. Finally, advantages and limitations for the proposed algorithm are briefly addressed. (Author)

AD-A086 875/2 PC **A04**/MF **A01**
Princeton Univ NJ Dept of Mechanical and Aerospace Engineering
Experimental Study of Three-Dimensional Shock Wave Turbulent Boundary Layer Interaction - Scaling of Sharp and Blunt Fin-Induced Flowfields.
Final rept. 4 May 78-3 May 80,
David S. Dolling, and Seymour M. Bogdonoff. Jul 80, 61p Rept no. MAE-1483
Contract N60921-78-C-0068

An experimental study of three-dimensional (3-D) shock wave turbulent boundary layer interaction has been carried out. Interactions generated by fin models having sharp and hemi-cylindrically blunted leading edges have been studied. Tests have been made using incoming turbulent boundary layer varying in thickness in the ratio of about 4:1. Extensive surface property measurements have been made on the test surface on which the incoming boundary layer developed and on the fin itself. All of these tests were carried out at a nominal freestream Mach number of 3, a freestream unit Reynolds number of about 63 million per meter, and under approximately adiabatic wall conditions. The emphasis in the study reported on in this paper was on two main areas. First, to determine the key geometric and/or flow parameters controlling the overall scaling and characteristics of both blunt and sharp fin-induced interactions. Second, to identify the conditions under which both blunt and sharp fins induced interactions have the same local scale and characteristics. (Author)

ESDU-80006 PC**$386.50**
Engineering Sciences Data Unit Ltd., London (England).
Drag Increment Due to Rear Fuselage Upsweep.
Data item.
c1980, 10p ISBN-0-85679-290-X
Also pub. as ISSN-0141-397X.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The purpose of the report is to predict drag increment due to rear fuselage upsweep. The results may be applied to the calculation of cruise drag. The research is relevant to military and civil transport aircraft, subcritical Mach numbers.

N80-27279/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Transonic Small Disturbances Equation Applied to the Solution of Two-Dimensional Nonsteady Flows.
M. Couston, J. J. Angelini, and P. Mulak. Apr 80, 36p NASA-TM-75795
Contract NASW-3199
Transl. into English from la Rech. Aerospatiale, No. 5, Sep. - Oct. 1979 p 325-340 Original Document Prepared by Onera. Original Language Document Announced as A80-12357. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Transonic nonsteady flows are of large practical interest. Aeroelastic instability prediction, control figured vehicle techniques or rotary wings in forward flight are some examples justifying the effort undertaken to improve knowledge of these problems is described. The numerical solution of these problems under the potential flow hypothesis is described. The use of an alternating direction implicit scheme allows the efficient resolution of the two dimensional transonic small perturbations equation.

N80-27281/8 PC **A09**/MF **A01**
Lockheed-Georgia Co., Marietta.
Exploratory Studies of the Cruise Performance of Upper Surface Blown Configurations.
Final Summary Report.
J. A. Braden, J. P. Hancock, J. E. Hackett, K. P. Burdges, and V. Lyman. Jul 80, 191p NASA-CR-3193, LG77ER0028
Contract NAS1-13871

The data and major conclusions obtained from an experimental/analytical study of upper-surface blown (USB) configurations at cruise are summarized. The high-speed (subsonic) experimental work, studying the aerodynamic effects of wing-nacelle geometric variations, was conducted around semi-span model configurations composed of diversified, interchangeable components. Power simulation was provided by high pressure air ducted through closed forebody nacelles. Nozzle geometry was varied across size, exit aspect ratio, exit position and boattail angle. Both 3-D force and 2-D pressure measurements were obtained at cruise Mach numbers from 0.5 to 0.8 and at nozzle pressure ratios up to about 3.0. The experimental investigation was supported by an analytical synthesis of the system using a vortex lattice representation with first-order power effects. Results are also presented from a compatibility study in which a short-haul transport is designed on the basis of the aerodynamic findings in the experimental study as well as acoustical data obtained in a concurrent program. High-lift test data are used to substantiate the projected performance of the selected transport design.

N80-27282/6 PC **A06**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
An Improved Panel Method for the Solution of Three-Dimensional Leading-Edge Vortex Flows. Volume 1: Theory Document.
Final Report, Dec. - May 1977.
F. T. Johnson, P. Lu, and E. N. Tinoco. Jul 80, 123p NASA-CR-3278
Contracts NAS1-15169, NAS1-15275

An improved panel method for the solution of three dimensional flow and wing and wing-body combinations with leading edge vortex separation is presented. The method employs a three dimensional inviscid flow model in which the configuration, the rolled-up vortex sheets, and the wake are represented by quadratic doublet distributions. The strength of the singularity distribution as well as shape and position of the vortex spirals are computed in an iterative fashion starting with an assumed initial sheet geometry. The method calculates forces and moments as well as detail surface pressure distributions. Improvements include the implementation of improved panel numerics for the purpose of elimination the highly nonlinear effects of ring vortices around double panel edges, and the development of a least squares procedure for damping vortex sheet geometry update instabilities. A complete description of the method is included. A variety of cases generated by the computer program implementing the method are presented which verify the mathematical assumptions of the method and which compare computed results with experimental data to verify the underlying physical assumptions made by the method.

N80-27283/4 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Effect of Reynolds Number on Stability Characteristics of a Cruciform Wind-Body.
R. L. Stallings, Jr., M. Lamb, and C. B. Watson. Jul 80, 111p NASA-TP-1683, L-13530

An experimental investigation was conducted to determine the effect of Reynolds number on the stability characteristics of a body with cruciform wings at large angles of attack. Pressure distributions and force and moment data (axial force not measured) are presented for Mach 1.60 and 2.70, Reynolds numbers based on body diameter from approximately 130,000 to 2,800,000, and angles of attack from 0 deg to 50 deg. In general, the data show only small effects of Reynolds number throughout the range of test condition. Also discussed are force balance and pressure data that suggest a direct relationship between wind choking and the onset of a nonlinear stability variaton with angle of attack.

N80-27287/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Experimental Studies of Scale Effects on Oscillating Airfoils at Transonic Speeds.
S. S. Davis. Jul 80, 16p NASA-TM-81216, A-8259

Experimental data are presented on the effect of Reynolds number on unsteady pressures induced by the pitching motion of an oscillating airfoil. Scale effects are discussed with reference to a conventional airfoil (NACA 64A010) and a supercritical airfoil (NLR 7301) at mean-flow conditions that support both weak and strong shock waves. During the experiment the Reynolds number was varied from 3,000,000 to 12,000,000 at a Mach number and incidence necessary to induce the required flow. Both fundamental frequency and complete time history data are presented over the range of reduced frequencies that is important in aeroelastic applications. The experimental data show that viscous effects are important in the case of the supercritical airfoil at all flow conditions and in the case of the conventional airfoil under strong shock-wave conditions. Some frequency-dependent viscous effects were also observed.

1B. Aeronautics

AD-A086 458/7 PC **A03**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Tactical Night Terrain Flight Navigation.
Final rept.,
James A. Bynum, and Garvin L. Holman. Sep 79, 48p Rept no. ARI-RR-1226

This report documents two experiments which were conducted to determine the training required to improve tactical night terrain flight aircrew performance. These experiments sought, specifically, to identify critical factors which should be included in a program of instruction for tactical night terrain flight navigation training with unaided vision. In the first experiment a passive navigation task was used to establish an altitude which would provide adequate training with a safety margin, the types of terrain or other features which should be used for checkpoint identification, and the effect of daylight exposure to a route on subsequent navigation performance. Using Experiment I as a building block, Experiment II tested the effects on active navigation performance of light level, type of map, and order in which light level was experienced. Multiple step-wise linear regression was used to determine associations among the variables and provided an accounting of the variance attributable to each variable of interest. It was concluded that unaided vision navigation is possible at illumination levels as low as .0002 foot candles. Instructional programs must consider restrictions to visibility, map type, proper preflight planning, adequate dark adaptation, a standardized intra-cockpit phraseology, and should use natural terrain features with vertical relief for checkpoint identification. (Author)

AD-A086 595/6 PC **A08**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Safety
Summary of Federal Aviation Administration Responses to National Transportation Safety Board Safety Recommendations.
Quarterly rept. Jan-Mar 80,
J. R. Harrison. May 80, 170p Rept no. FAA-ASF-80-1

This report presents NTSB recommendations and all FAA responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions. The Table of Contents for this report reflects only those NTSB recommendations which are still open pending FAA action (i.e., those that have not been designated as 'Closed' by the NTSB as a result of acceptable FAA action). Accordingly, the Table of Contents may reflect a number of multiple recommendations (example: A-79-98 through 105), but background material is included only for those recommendations which remain in an 'Open' status. Background information for those recommendations which have been closed are available in FAA headquarters files.

AD-A086 855/4 PC **A02**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA

Helicopter Electro-Optical System Display Requirements. II. Performance of Helicopter Pilots When Using a Low-Light-Level Television System during Simulated Night Nap-of-the-Earth Flight.
Technical rept.,
Aaron Hyman, Richard M. Johnson, and Paul A. Gade. Mar 80, 21p Rept no. ARI-TR-442

Previous ARI research has shown that pilots feel they can successfully use a low-light-level television system as an aid in night nap-of-the-earth (NOE) flight, even when the highlight luminance of its display is as little as 0.06 footlambert (fL). Videotaped presentations were used in this prior research, and estimations of the lowest usable display luminance were established on the basis of pilot judgment. The present experiment was designed to provide more objective evidence for determining the utility of such low-luminance displays when they are used as aids in night NOE flight. Each of 24 Army helicopter pilots made 24 simulated flights over a highly realistic three-dimensional terrain model as generated from an optical probe used in conjunction with an SIT television camera. The results showed that pilots had fewer crashes when using a larger display. All pilots flew as well with displays set so that highlight luminance was about 0.05 fL as they did with displays set so highlight luminance was about 0.2 fL. This report discusses the implications of these results for designing a usable low-light-level television system for night NOE flight. (Author)

AD-A086 857/0 PC **A04**/MF **A01**
Army Aviation Research and Development Command St Louis MO
Investigation of Helicopter Wire Strike Protection Concepts.
Technical memo. Aug-Nov 79,
LeRoy T. Burrows. Jun 80, 52p Rept no. USAAVRADCOM-TM-80-D-7

In-flight wire strikes pose a serious threat to low-level helicopter operations. Tests were conducted to determine the suitability for U. S. Army helicopter applications of the Canadian Wire Strike Protection System (WSPS), developed by Bristol Aerospace Limited. The WSPS consists of fuselage-mounted upper and lower cutters and a windshield centerpost deflector with a sawtooth cutter. Using the NASA/Langley Research Center Crash Impact Dynamics Facility, an OH-58A fitted with the WSPS was subjected to pendulum swing tests in which the helicopter struck fixed cables at approximately 40 knots airspeed. The system demonstrated the capability to easily sever 10,000-pound-strength 3/8-inch steel messenger cable, 50-pair copper communications cable, and 0.419-inch high-power transmission lines, including multiple arrays of those cables. Data acquired indicated that the wire impact/deflection/cutting sequence would not have a significant effect on helicopter performance, control crew functioning, or blade flapping. Installation of the WSPS on the entire Army tactical helicopter fleet is recommended. An additional test of a device to deflect wires past the helicopter skid gear, vertical stabilizer, and tail rotor was conducted. A 7/8-inch tubular steel deflector was designed and fabricated. The device proved to be inadequate. It was concluded that a skid gear deflector is not a practical OH-58A retrofit from a cost and weight standpoint. (Author)

PB80-201916 PC **A10**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Annual Review of Aircraft Accident Data - U.S. General Aviation Calendar Year 1978.
Summary rept.
20 May 80, 209p NTSB-ARG-80-1
See also report for 1977, PB-291 627.

The publication presents a detailed summary of aircraft accidents which occurred in U.S. general aviation operations during the calendar year 1978. It includes an analysis of accident data providing an overview, types of accidents, accident causal factors, kind of flying, and conclusions; a statistical compilation of accident information presented in the form of accident and rate tables, analytic tables, injury tables and cause/factor tables. These statistical data are divided into sections pertaining to all operations, small fixed-wing aircraft, large fixed-wing aircraft, rotorcraft, gliders, and collisions between aircraft. In 1978, there were 4,494 total general aviation accidents, 793 of which were fatal. Included in the total number of accidents are 63 collisions between aircraft. In coding each aircraft involved in collisions, an additional 63 records resulted, which brought the total number of accident records to 4,557. This figure reflects the actual number of pilots and aircraft involved in the accidents.

PB80-910408 PC**$5.00**/MF**$5.00**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report - COMAIR, Inc., Piper PA-31, N6642L, Greater Cincinnati Airport, Covington, Kentucky, October 8, 1979.
28 May 80, 36p NTSB-AAR-80-8
Paper copy also available on subscription, North American Continent price $50.00/year; all others write for quote.

On October 8, 1979, at 1008:26, COMAIR, Inc., Flight 444, a Piper PA31-310, with a pilot and seven passengers on board, crashed on takeoff from runway 18 at the Greater Cincinnati Airport, Covington, Kentucky. The pilot and the seven passengers on board were killed, and the aircraft was destroyed. After 1,500 to 2,000 ft of takeoff roll, the aircraft lifted off abruptly and climbed slowly to about 150 ft above the runway. Following liftoff, the pilot reported a loss of power from an engine, and the tower controller cleared the pilot to return and land. Seconds later, the aircraft rolled to the right to an inverted position and dove, nose first, to the ground. The National Transportation Safety Board determines that the probable cause of the accident was the loss of control following a partial loss of power immediately after liftoff. The accident could have been avoided if either the pilot had rejected the takeoff or had raised the landing gear and flaps. His failure to take decisive action may have been due to preoccupation with correcting the malfunction, and a lack of familiarity with the aircraft and with its emergency procedures. Contributing to the accident was the pilot's inexperience in multiengine aircraft, a hurried departure, inadequate training, inexperienced company management, and ineffective FAA certification and surveillance of the operator.

1C. Aircraft

AD-A086 316/7 PC **A03**/MF **A01**
University of Southern California Los Angeles Dept of Aerospace Engineering
The Oblique Wing as a Lifting-Line Problem in Transonic Flow.
Rept. for 1978-1979,
H. K. Cheng, and S. Y. Meng. 14 Jun 79, 31p
Contract N00014-75-C-0520
Pub. in Jnl. of Fluid Mechanics, v97 pt3 p531-556 1980.

No abstract available.

AD-A086 327/4 PC **A05**/MF **A01**
Systems Control Inc (Vt) Palo Alto CA
Analysis of T-2C High Angle of Attack Flight Test Data with Nonlinear System Identification Methodology.
Final rept. 3 Apr 72-31 May 78,
James H. Vincent, W. Earl Hall, Jr., and Jeff G. Bohn. Mar 80, 91p ONR-CR212-259-1F
Contract N00014-72-C-0328

This study represents one of the first thorough applications of advanced nonlinear system identification techniques to the problem of determining aircraft aerodynamic characteristics in the maximum-lift flight regime, and has produced results confirming the ability of these methods to develop realistic and useful dynamics models for flight test data and to provide a valuable guide for data acquisition system specification in future flight test programs. This study also demonstrated the value of employing wind tunnel data and theoretical (or empirical) aerodynamic analyses during the model structure determination stage in order to begin with a basic familiarity with the nature of nonlinearities to be encountered. (Author)

AD-A086 358/9 MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Quantitative Measurements of the Effects of Variations in Panel Density and Distributions for Panel Method Computer Programs.
Final rept.,
Wilson C. Obi. Jan 80, 155p Rept no. NADC-80029-60
Availability: Microfiche copies only.

Panel distributions have been characterized independently in terms of computable and controllable parameters. Thus, a methodology has been developed which will permit a conclusive establishment of the sensitivities of paneling parameters to aerodynamic estimation quality for a wide variety of paneling codes. It has been demonstrated that the global performance (input-output relationships, precision, and accuracy) of a panel method computer program can be established through calibration. Application of the sensitivity analysis developed herein to SURAIR (a Woodward constant pressure panel method derivative) has shown that it is possible to increase estimation accuracy without the commonly expected increase in computation cost. (Author)

AD-A086 470/2 MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Fatigue Damage Estimation for the BAeA Aircraft Fatigue Data Analysis System.
Technical memo.,
Robert C. Fraser. Aug 79, 57p Rept no. ARL/STRUC-TM-297
Availability: Microfiche copies only.

The estimation of the fatigue damage from the strain range pair data generated by the airborne component of the BAeA Aircraft Fatigue Data Analysis System is described. (Author)

AD-A086 528/7 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Wessex Helicopter/Sonar Dynamics Study. ARL Program Description and Operation.
Aerodynamics note,
Neil V. Williams, Christopher R. Guy, Maxwell J. Williams, and Neil E. Gilbert. Feb 79, 40p Rept no. ARL/AERO NOTE-385

A computer program, representing the dynamic behaviour in flight of the Wessex Mark-31B helicopter and its anti-submarine warfare (ASW) sonar equipment is described. The program is intended for operation on a PDP-10 computer and is written in CSMP-10 (ARL) simulation language. Instructions for setting up a particular simulated flight manoeuvre are given, together with details of program verification.

AD-A086 529/5 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Sea King Mk. 50 Helicopter Flight Control System. A Mathematical Model of the Flying Controls.
Aerodynamics note,
Christopher R. Guy. Feb 79, 32p Rept no. ARL/AERO Note-388

A mathematical model for the flying controls of the Sea King Ozark-50 helicopter is presented. The operation of the systems and components used in the flying controls of the aircraft is described first, followed by a detailed description of the construction and functioning of the mathematical model. Equations and diagrams for the model are included. (Author)

AD-A086 599/8 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
The Strength of Occupant Restraint Systems in Light Aircraft - An Experimental Evaluation.
Final rept. 1976-1978,
S. R. Sarrailhe. Feb 79, 43p Rept no. ARL/STRUC-375

The cabins and restraint systems of three cyclone-damaged light aircraft were tested statically to determine the strength of the restraint system in the cabin. It was found that most restraint components were much stronger than demanded by the 9 g requirement and it was considered that only minor improvements would be needed to ensure 25 g capability. Seats were not as strong as the restraints

and their behaviour under crash load conditions requires further investigation. (Author)

AD-A086 704/4 PC **A02**/MF **A01**
Naval Weapons Center China Lake CA
Store Separation Trajectory Analysis.
Rept. for 1972-1978,
Arthur R. Maddox. Jan 80, 24p Rept no. NWC-TP-6067

A series of store drops was made at moderate to high subsonic speeds with the same configuration on the center position of a triple ejector rack on an F-4 inboard pylon. The data were compared with wind tunnel and mathematical simulations. Both estimation techniques predicted the general nature of the motion, especially at low speeds, but failed to predict a minor collision observed at high speed. (Author)

AD-A086 721/8 PC **A04**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Calibration of Mirage Main Undercarriage to Determine Wheel Loads from Measured Strains.
Technical memo.,
K. C. Watters, and P. Atcliffe. Jul 79, 60p Rept no. ARL/STRUC-TM-300

The port and starboard legs of a test main undercarriage of the Mirage IIIO have each been instrumented with six independent strain gauges and a potentiometer to measure oleo deflection. Calibration tests were performed in which components of the ground-to-wheel load were applied to each leg, both singly and in combination, and, from the measured strains, calibration parameters were derived. In order to determine wheel load components from measured strains, an iterative method of inverting the non-linear set of equations formed from the calibration parameters was developed. It was found that, due to the insensitive response of any gauge to the vertical load component, the equations were ill-conditioned, with calculated load components being very sensitive to changes in the measured strains. (Author)

AD-A086 754/9 PC **A08**/MF **A01**
Boeing Vertol Co Philadelphia PA
Design, Development, and Flight Demonstration of the Loads and Stability Characteristics of a Bearingless Main Rotor.
Final rept. Jun 76-Oct 79,
Peter G. C. Dixon. Jun 80, 162p
USAAVRADCOM-TR-80-D-3
Contract DAAJ02-76-C-0026

The successful design, development, bench and whirl testing, and flight demonstration of the loads and stability characteristics of a bearingless main rotor (BMR) on the BO-105 helicopter were accomplished. The initial tests indicated that ground resonance damping was inadequate. For this program, a minimal modification, the stiffening of the aircraft skid landing gear, provided adequate damping for the continuation of the program. The BMR/BO-105 had similar air resonance to the baseline BO-105, except at low collective pitch settings where the BMR had lower but sufficient damping. Vibration levels were generally similar to the baseline, but in some regimes were higher. Maneuvering stability showed a significant improvement and other flight characteristics were similar to those of the standard BO-105. The level flight speed was limited only by power available and the 35-hr flight test program was not limited by structural characteristics. The feasibility of helicopter bearingless main rotors has thus been demonstrated. Understanding of the loads distribution in the two-beam lag/flap/torsion flexure at the blade root of this configuration needs improvement. Use of Froude scaled model wind tunnel testing accurately predicted the flight aeromechanical stability characteristics of the BMR; however, the analytical stability prediction methodology, although sufficiently accurate in hover, requires improvement and expansion into the forward flight modes.

AD-A086 818/2 PC **A05**/MF **A01**
Boeing Vertol Co Philadelphia PA
Evaluation of Forged Helicopter Components Processed with Controlled Solidification and Thermal-Mechanical Treatments.
Final rept. Dec 76-Jun 80,
William L. Weiss. Jun 80, 76p D210-11524-1, USAAVRADCOM-TR-80-F-6
Contract DAAA25-77-C-0015

A four task program was conducted to provide information for evaluating helicopter dynamic system components fabricated from aluminum alloy forgings produced with advanced processing techniques. Components produced with the advanced techniques, involving intermediate thermal-mechanical treatment of ingots, were tested side-by-side with conventionally produced components. Tests were conducted to determine fatigue strength and damage tolerance characteristics of the components. (Author)

AD-A086 836/4 PC **A02**/MF **A01**
Tufts Univ Medford MA Dept of Electrical Engineering
New Hardware for Tethered Balloons,
Alvin H. Howell. Jan 80, 15p SCIENTIFIC-2, AFGL-TR-80-0108
Contract F19628-77-C-0047

Three hardware items have been produced which should be useful in tethered balloon operations. They are: a self-contained balloon valve, called a smart valve, which can be used in a hostile environment; a general-purpose tetrahedron, which simplifies balloon let-up when multiple tethers are employed; and quick-acting coupling; which speed up the launch procedure. (Author)

AD-A086 849/7 PC **A07**/MF **A01**
Army Armament Research and Development Command Dover NJ Large Caliber Weapon Systems Lab
Progress Report III of Cooperative Program for Design, Fabrication, and Testing of High Modulus Composite Helicopter Shafting.
Final rept. 1 Jan 75-30 Jun 79,
Charles C. Wright, and Donald J. Baker. Jun 80, 141p ARLCD-TR-79028, AD-E400 434
See also rept. dated Dec 74, AD-A005 024.

This report describes the third phase of work, the objective of which was to overcome the excessive brittleness of the previously developed UH-1 helicopter tail rotor drive shaft design which demonstrated a shaft train weight savings of 53.1% over the current 2024-T3 aluminum shaft train. A materials impact program demonstrated exceptionally noteworthy performance of two woven constructions containing E-glass and PRD 49-III (designation later changed to KEVLAR 49) fibers in an epoxy resin matrix. Thermoplastic matrices and PRD 49-III fiber provided impact resistance at low weight which was superior to composites having the same fiber in a thermoset resin matrix. A design, fabrication, and test program showed that shaft impact resistance could be improved over the previously developed graphite composite design at a cost in shaft train rate savings. The shaft train weight savings of the most impact tolerant construction was 4.0% over the current aluminum shaft train. Alternating plies of graphite and glass appear to provide substantially greater tube impact durability than that provided by hybridization of the two fibers into one tape wound to a ply design equivalent in strength and stiffness to that of the alternating ply design. Recommendations were made to continue research work to exploit the potential for more impact-durable structures through the use of KEVLAR 49 fiber, woven structures, thermoplastic matrices and THORNEL 50-S/KEVLAR 49 blends with thermoset matrices.

ESDU-80009 PC**$290.50**
Engineering Sciences Data Unit Ltd., London (England).
The Use of Data Items on Aircraft Performance Measurement.
Data item.
c1980, 9p ISBN-0-85679-292-6
Supersedes ESDU-75017. Also pub. as ISSN-0141-4054.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The report explains the purpose of flight testing and the principles that govern the methods of processing the data obtained, to show the interrelationship between the various items that treat particular aspects, and to indicate how methods not currently discussed in the items might be applied or to draw the user's attention to where such approaches are discussed in the literature. The referenced reports describe in processing flight test data obtained from aircraft with turbo-fan, turbojet, turbo-prop or piston engines.

N80-27280/0 PC **A09**/MF **A01**
Boeing Aerospace Co., Seattle, Wash.
An Improved Panel Method for the Solution of Three-Dimensional Leadingedge Vortex Flows. Volume 2: User's Guide and Programmer's Document.
Report, Dec. 1977 - May 1979.
E. N. Tinoco, P. Lu, and F. T. Johnson. Jul 80, 176p NASA-CR-3279
Contracts NAS1-15169, NAS1-15275

A computer program developed for solving the subsonic, three dimensional flow over wing-body configurations with leading edge vortex separation is presented. Instructions are given for the proper set up and input of a problem into the computer code. Program input formats and output are described, as well as the overlay structure of the program. The program is written in FORTRAN.

N80-27302/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Tire Stiffness and Damping Determined from Static and Free-Vibration Tests.
R. K. Sleeper, and R. C. Dreher. Jul 80, 45p NASA-TP-1671, L-13500

Stiffness and damping of a nonrolling tire were determined experimentally from both static force-displacement relations and the free-vibration behavior of a cable-suspended platen pressed against the tire periphery. Lateral and force-and-aft spring constants and damping factors of a 49 x 17 size aircraft tire for different tire pressure and vertical loads were measured assuming a rate-independent damping form. In addition, a technique was applied for estimating the magnitude of the tire mass which participates in the vibratory motion of the dynamic tests. Results show that both the lateral and force-and-aft spring constants generally increase with tire pressure but only the latter increased significantly with vertical tire loading. The fore-and-aft spring constants were greater than those in the lateral direction. The static-spring-constant variations were similar to the dynamic variations but exhibited lower magnitudes. Damping was small and insensitive to tire loading. Furthermore, static damping accounted for a significant portion of that found dynamically. Effective tire masses were also small.

N80-27303/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Development of the Zepplin Dirigible for Long Distance Transportation.
A. Ehrle. Apr 80, 18p NASA-TM-76143
Contract NASW-3199
Transl. Into English of "Gedenken an die Hundertste Wiederkehr des Geburtstages des Grafen Zeppelin', Deutchen Academie der Luftfahrtforschung, (Germany, F.R.), 17 Jun. 1938 p 33-47. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Changes in the design and construction of German airships for regular transoceanic passenger transportation during the 1916 to 1938 period are described. Technical problems related to structural weight, fuel reduction, and passenger comfort are considered.

N80-27350/1 PC **A07**/MF **A01**
Hydraulic Research Textron, Valencia, CA.
Flightworthy Active Control Landing Gear for a Supersonic Aircraft.
Final Report.
I. Ross. Jun 80, 141p NASA-CR-3298
Contract NAS1-15455

A flightworthy active control landing gear system for a supersonic aircraft was designed to minimize aircraft loads during takeoff, impact, rollout, and taxi. The design consists of hydromechanical modifications to the existing gear and the development of a fail-safe electronic controller. NALYTICAL RESULTS INDICATE that for an aircraft sink

rate of 0.914 m/sec (3 ft/sec) the system achieves a peak load reduction of 36% during landing impact.

N80-27351/9 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
Measures for Improving the Zeppelin Airships for Long Distance Transportation.
L. F. Duerr. Apr 80, 19p NASA-TM-76142
Contract NASW-3199
Transl. Into English of "Gedenken an die Hundertste Wiederkehr des Geburtstages des Grafen Zeppelin", Deutschen Akademie der Luftfahrtforschung, (Germany, F.R.), 17 Jun. 1938 p 15-30. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Factors to be considered in the construction of dirigibles include the design and weight of support structures, static and aerodynamic loads on the main ring, the annealing of support materials, and the dynamic gas pressure. Adaptations made for using helium as the lifting gas, and a method for extracting ballast are described.

1D. Aircraft Flight Control and Instrumentation

AD-A086 557/6 MF A01
McDonnell Douglas Astronautics Co-St Louis MO
The USAF Stability and Control Digital DATCOM. Volume I. Users Manual.
Final rept. Aug 77- Nov 78,
John E. Williams, and Steven R. Vukelich. Apr 79, 321p AFFDL-TR-3032-VOL-1
Contract F33615-77-C-3073
Supersedes Rept. no. AFFDL-TR-76-45-VOL-1, AD-A045 171. See also Volume 2, AD-A086 558.
Availability: Microfiche copies only.

This report describes a digital computer program that calculates static stability, high lift and control, and dynamic derivative characteristics using the methods contained in the USAF Stability and Control Datcom (revised April 1976). Configuration geometry, attitude, and Mach range capabilities are consistent with those accommodated by the Datcom. The program contains a trim option that computes control deflections and aerodynamic increments for vehicle trim at subsonic Mach numbers. Volume I is the user's manual and presents program capabilities, input and output characteristics, and example problems. The program is written in ANSI Fortran IV. The primary deviations from standard Fortran are Namelist input and certain statements required by the CDC compilers. Core requirements have been minimized by data packing and the use of overlays. User oriented features of the program include minimized input requirements, input error analysis, and various options for application flexibility.

AD-A086 558/4 PC A08/MF A01
McDonnell Douglas Astronautics Co-St Louis MO
The USAF Stability and Control Digital DATCOM. Volume II. Implementation of Datcom Methods.
Final rept. Aug 77-Nov 78,
John E. Williams, and Steven R. Vukelich. Apr 79, 164p AFFDL-TR-79-3032-VOL-2
Contract F33615-77-C-3073
Supersedes Rept. no. AFFDL-TR-76-45-VOL-2, AD-A045 172. See also Volume 3, AD-A086 559.

This report describes a digital computer program that calculates static stability, high lift and control, and dynamic derivative characteristics using the methods contained in the USAF Stability and Control Datcom. Configuration geometry, attitude, and Mach range capabilities are consistent with those accommodated by the Datcom. The program contains a trim option that computes control deflections and aerodynamic increments for vehicle trim at subsonic Mach numbers. Volume II describes program implementation of Datcom methods. The program is written in ANSI Fortran IV. The primary deviations from standard Fortran are Namelist input and certain statements required by the CDC compilers. Core requirements have been minimized by data packing and the use of overlays. User oriented features of the program include minimized input requirements, input error analysis, and various options for application flexibility.

AD-A086 559/2 PC A05/MF A01
McDonnell Douglas Astronautics Co-St Louis MO
The USAF Stability and Control Digital DATCOM. Volume III. Plot Module.
Final rept. Aug 77-Nov 78,
John E. Williams, and Steven R. Vukelich. Apr 79, 81p AFFDL-TR-79-3032-VOL-3
Contract F33615-77-C-3073
Supersedes Rept. no. AFFDL-TR-76-45-VOL-3. See also Volume 1, AD-A086 557.

This report describes a digital computer program that calculates static stability, high lift and control, and dynamic derivative characteristics using the methods contained in the USAF Stability and Control Datcom. Configuration geometry, attitude, and Mach range capabilities are consistent with those accommodated by the Datcom. The program contains a trim option that computes control deflections and aerodynamic increments for vehicle trim at subsonic Mach numbers. Volume III discusses a separate plot module for Digital Datcom. The program is written in ANSI Fortran IV. The primary deviations from standard Fortran are Namelist input and certain statements required by the CDC compilers. Core requirements have been minimized by data packing and the use of overlays. User oriented features of the program include minimized input requirements, input error analysis, and various options for application flexibility.

N80-27360/0 PC A03/MF A01
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA
Flight Investigation of Cockpit-Displayed Traffic Information Utilizing Coded Symbology in an Advanced Operational Environment.
T. S. Abbott, G. C. Moen, L. H. Person, Jr., G. L. Keyser, Jr., and K. R. Yenni. Jul 80, 31p NASA-TP-1684, AVRADCOM-TR-80-B-4
Contract DA PROJ. 1L2-62209-AH-76

Traffic symbology was encoded to provide additional information concerning the traffic, which was displayed on the pilot's electronic horizontal situation indicators (EHSI). A research airplane representing an advanced operational environment was used to assess the benefit of coded traffic symbology in a realistic work-load environment. Traffic scenarios, involving both conflict-free and conflict situations, were employed. Subjective pilot commentary was obtained through the use of a questionnaire and extensive pilot debriefings. These results grouped conveniently under two categories: display factors and task performance. A major item under the display factor category was the problem of display clutter. The primary contributors to clutter were the use of large map-scale factors, the use of traffic data blocks, and the presentation of more than a few airplanes. In terms of task performance, the cockpit-displayed traffic information was found to provide excellent overall situation awareness. Additionally, mile separation prescribed during these tests.

N80-27397/2 PC A09/MF A01
Northrop Corp., Hawthorne, CA. Aerosciences Lab.
System Description and Analysis. Part 1: Feasibility Study for Helicopter/VTOL Wide-Angle Simulation Image Generation Display System.
Final Report.
Oct 77, 198p NASA-CR-152376, NOR-77-102-PT-1
Contract NAS2-9351
Sponsored in Part by Army Air Mobility and Research and Development Lab. And Ames Research Center, Mountain View, Calif.

A preliminary design for a helicopter/VSTOL wide angle simulator image generation display system is studied. The visual system is to become part of a simulator capability to support Army aviation systems research and development within the near term. As required for the Army to simulate a wide range of aircraft characteristics, versatility and ease of changing cockpit configurations were primary considerations of the study. Due to the Army's interest in low altitude flight and descents into and landing in constrained areas, particular emphasis is given to wide field of view, resolution, brightness, contrast, and color. The visual display study includes a preliminary design, demonstrated feasibility of advanced concepts, and a plan for subsequent detail design and development. Analysis and tradeoff considerations for various visual system elements are outlined and discussed.

N80-27913/6 PC A02/MF A01
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Accuracy of Aircraft Velocities from Inertial Navigation Systems for Application to Airborne Wind Measurements.
R. H. Rhyne. Jul 80, 15p NASA-TM-81826, L-13616

An experimental assessment was made of two commercially available inertial navigation systems (INS) with regard to their velocity measuring capability for use in wind, shear, and long-wavelength atmospheric turbulence research. The assessment was based on 52 sets of postflight measurements of velocity (error) during a 'Schuler cycle' (84 minutes) while the INS was still operating but the airplane was motionless. Four INS units of one type and two units of another were tested over a period of 2 years after routine research flights similar to air-linetype operations of from 1 to 6 hours duration. The maximum postflight errors found for the 52 cases had a root mean square value of 2.82 m/sec with little or no correlation of error magnitude with flight duration. Using an INS for monitoring ground speed during landway in a predicted high wind shear situation could lead to landing speeds which are dangerously high or low.

1E. Air Facilities

AD-A086 293/8 PC A08/MF A01
Federal Aviation Administration Washington DC Associate Administrator for Airports
Operations under the Airport and Airway Development Act of 1970 as Amended by the Airport and Airway Development Act Amendments of 1976.
Rept. no. 10 (Annual) for period ending 30 Sep 79,
Virginia J. Martin. 1979, 161p Rept no. FAA-ARP-80-1
See also rept. no. FAA-ARP-79-1, AD-A069 023.

Section 24 of the Airport and Airway Development Act of 1970 (P.L. 91-258) requires that the Secretary, Department of Transportation, submit an annual report to Congress of operations under Part II of the Act for the preceding fiscal year. This report covers operations for the fiscal year ending September 30, 1979. (Author)

AD-A086 864/6 MF A01
Douglas Aircraft Co Long Beach CA
Evaluation of the Impact of Towing DC-9 Transport Airplanes at Boston-Logan Airport.
Final rept. Sep 78-Oct 79,
E. A. Hoover. May 80, 120p FAA-NA-80-23
Contract DOT-FA78WA-4198
Availability: Microfiche copies only.

This report summarizes an investigation to determine the impact of the proposed revisions to airport rules at Boston-Logan International Airport regarding ground movement of aircraft by towing in lieu of taxiing as it affects the fatigue life of the DC-9 aircraft. Tests were conducted using an instrumented tow bar to determine the range of loads which could be expected to occur in service. These loads were then incorporated into a loads model which represents the Boston-Logan towing regime. This loads model was then utilized to perform analysis on the DC-9 nose landing gear and its support structure to determine the fatigue effects. Cost estimates of additional testing, inspection and replacement of affected parts is provided. The results of this investigation indicate that several nose landing gear components could be seriously affected depending upon the degree of exposure to the additional towing at Boston and the number of flights already accumulated by the part at the time the additional towing is initiatad at Boston. The immediate effect on these compo-

nents could be minimized by a redistribution of aircraft within the airline fleet to reduce the exposure of high-time parts of the Boston towing regime. (Author)

2. AGRICULTURE

2B. Agricultural Economics

PB80-201106 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY.
Proceedings of a Workshop on Grass-Fed and Grain-Fed Livestock Production Systems: Energy and Land Resources Held at Cornell Univ., Ithaca, NY on October 19 and 20, 1978.
1978, 25p NSF/RA-780736
Grant NSF-AER77-01581

This workshop considered grain-fed versus grass-fed livestock systems with respect to productive inputs which would be affected by a switch to a grass-fed livestock system in the U.S. The keynote presentation outlined implications of a shift from the present grain-grass fed livestock system toward an entirely grass-fed livestock production system.

PB80-202740 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Effects of Government Policy on Agriculture: An Empirical Analysis.
Staff rept.,
R. McFall Lamm, Jr. Jan 80, 63p

Most empirical efforts to evaluate the effects of government policies on agriculture have considered policies applied to specific commodity sectors. The results have been the construction of a number of highly specialized sector models which ignore cross-sector policy effects. The paper presents the results of an attempt to construct an aggregate model of agriculture which considers jointly all major agricultural policies implemented over the last 3 decades. The results indicate that government intervention in agriculture generally reduced farm income and production below what it would have been; led to lower food prices, benefitting consumers; and constrained capital for labor substitution. Government programs did lead to greater price stability, however, which was a basic objective of agricultural programs.

PB80-203383 PC **A07**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. International Economics Div.
Global Food Assessment, 1980.
Foreign agricultural economic rept.
Jul 80, 130p FAER-159

World food production fell nearly 2.5 percent in 1979, the first decline in 7 years. Although output increased in South and Central America, it declined in most African countries and South Asia. Greatest food needs exist in the Sub-Saharan African regions and South Asia, but certain Central American, Caribbean, and South American countries will also require assistance. The report presents data on food production and 1980 outlook for 79 low-and middle-income countries, reviews the 1979 food situation, and describes international and U.S. food aid policies.

PB80-204894 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Statistical Research Div.
Forecasting Final Corn Grain Yield per Plant with a Constrained Logistic Growth Model.
Staff rept.,
Greg A. Larsen. Jan 80, 27p

The report describes the use of a constrained logistic growth model for forecasting mean dry grain weight per plant for corn at the state level. The constraining procedure uses historic information to restrict the early-season parameter estimates to correspond more closely to values that would have a greater probability of occurring at maturity. The use of prior information leads to large improvements in forecasting performance. State-level forecasts on August 1 were within 9 percent of the final direct estimates. The September 1 forecasts are within 3 percent of the final direct estimate for the data sets examined.

PB80-205263 PC **A05**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC.
Proceedings of the National Conference of Bargaining and Marketing Cooperatives (24th) Held at New Orleans, Louisiana on January 10-11, 1980.
Jul 80, 95p ESCS-83
See also report dated Aug 79, PB-298 914. Prepared in cooperation with National Committee on Agricultural Bargaining and Marketing Associations, Washington, DC.

This is a report of the proceedings of the 24th National Bargaining Conference, held January 10-11, 1980, in New Orleans, Louisiana. The report includes speeches at the conference and related information concerning industry developments and prospects, farm price data, long-term contractual arrangements, legislation outlook, and undue price enhancement.

2C. Agricultural Engineering

E80-10128 PC **A03**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Evaluation of Transition Year Canadian Test Sites.
Technical rept.,
R. W. Payne. Apr 80, 37p LEMSCO-14320, NASA-CR-160655, JSC-16338
Contract NAS9-15800
Sponsored in part by Department of Agriculture, Washington, DC., Department of Commerce, Washington, DC., and Department of the Interior, Washington, DC. Report on AgRISTARS.

The author has identified the following significant results. The spring small grain proportion accuracy in 15 Saskatchewan test sites was found to be comparable to that of the Large Area Crop Inventory Experiment Phase 3 and Transition Year results in the U.S. spring wheat states. Spring small grain labeling accuracy was 94%, and the direct wheat labeling accuracy was 89%, despite the low barley separation accuracy of 30%.

PB80-201312 PC **A04**/MF **A01**
Great Western Research, Inc., Mesa, AZ.
Identification and Economic Feasibility of Agricultural Management Practices Which Mitigate Salinity Impacts in Arid Lands Agriculture.
Final rept.,
Alan P. Kleinman. Mar 80, 58p NSF/RA-800059
Grant NSF-DAR79-17487

The primary objective of this study was to estimate the costs and benefits of on-farm salinity mitigation measures. Continued addition of irrigation water to the soil adds salts which may accumulate sufficiently to reduce plant growth and crop yields. Literature review and personal interviews with irrigation specialists, agriculturalists, and farm operators were carried out to ascertain the range of impacts associated with alternative management practices.

PB80-201668 PC **A06**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC.
Procedures for the Colorado Rio Grande Type IV Study ESCS-SCS Linear Programming Model.
Staff rept.,
Ronald Rhoade, and T. Niles Glasgow. Sep 79, 110p

ESCS and SCS developed a profit-maximizing linear programming model for estimating best use of agricultural land and water resources in the Rio Grande River basin in Colorado. The 2.4 million acres in the model included cropland, pasture and range in State and private ownership, of which about 610,000 acres were irrigated. Estimates were made for the years 2000 and 2020 in addition to the current time period. The model incorporates proposed watershed projects from the USDA-recommended plan of development. Economic effects of alternative uses of corner areas of fields irrigated by center pivot systems were evaluated.

PB80-202898 PC **A05**/MF **A01**
Texas A and M Univ., College Station. Water Resources Inst.
New Irrigation System Design for Maximizing Irrigation Efficiency and Increasing Rainfall Utilization.
Technical rept. 1 Oct 76-30 Sep 79,
William M. Lyle, and James P. Bordovsky. May 80, 77p TR-105, W80-06003, OWRT-A-041-TEX(1)
Contracts DI-14-34-0001-7092, DI-14-34-0001-8046
Sponsored in part by Contract DI-14-34-0001-9046.

A new concept in irrigation system design, which has the potential of significant savings in both water and energy requirements, has been developed and is under evaluation. The system is characterized by and has been labeled a low energy-precision application (LEPA) system, which rather than spraying water into the air at moderate to high pressures, distributes it directly to the furrow at very low pressure through drop tubes and orifice controlled emitters.

PB80-203144 PC **A12**/MF **A01**
Stone (Ralph) and Co., Inc., Los Angeles, CA.
Long-Term Effects of Land Application of Domestic Wastewater; Mesa, Arizona: Irrigation Site.
Rept. for Jan 75-May 78,
Ralph Stone, and James Rowland. Apr 80, 267p EPA-600/2-80-061
Contract EPA-68-03-2362

This report presents the results of an assessment of the long-term impacts on crops, soils, and groundwater resulting from irrigation with secondary-treated municipal effluent. The concentrations of pathogens, nutrients, heavy metals, and salts in soils, groundwater, and crops irrigated with secondary-treated wastewater were compared to the concentrations in soils, groundwater, and crops irrigated with conventional water supplies. Test and control sites at Mesa, Arizona, were selected as case studies for comparisons.

PB80-203243 PC **A02**/MF **A01**
National Weather Service, Garden City, NY. Eastern Region.
A Procedure for Spraying Spruce Budworms in Maine during Stable Wind Conditions.
Technical memo.,
Monte Glovinsky. May 80, 25p NOAA-TM-NWS-ER-65

A technique is developed to forecast winds and apply them for spraying 'in-wind' beyond the morning inversion period but before adverse thermal activity begins. Nomograms are constructed which determine drift distances of all drop size categories within the spray cloud for a given pressure gradient, wind to block direction component, and aircraft type. This gives an estimate of the proper offset of planned flight runs and of spray deposition.

PB80-204068 PC **A09**/MF **A01**
Municipality of Metropolitan Seattle-METRO, WA.
Effects of Sludge Irrigation on Three Pacific Northwest Forest Soils,
David D. Wooldridge, and John D. Stednick. Mar 80, 188p EPA-600/2-80-002
Grant EPA-R-802172

A sprinkler irrigation system developed for uniform applications of anerobically digested, municipal-industrial sewage sludge initially applied up to 5.8 mt/ha/wk. Reduced infiltration of sludge occurred due to physically blocking of soil pores, causing ponding of sludge in the micro-depressions.

Sludge loading rates were decreased to 10, 20, 30 and 40 mt/ha/yr. The renovating capacity of forest soils for most suspended and dissolved constituents in sludge was very good (95 to 99+ %). Optimum loading rates of 20 to 30 mt/ha/hr. of sludge show trends to increased surface soil total N, organic material and cation exchange capacity. Analyses for virus at all depths in the soil and from the soil solution at corresponding depths were negative, nor were human pathogens of the bacteria type isolated from the limited numbers of soils and soil solutions analyzed.

PB80-206188 PC **A07**/MF **A01**
Illinois Univ. at Urbana-Champaign. Water Resources Center.
Water Quality Control and Management of Animal Wastes Through Culture with Selected Fishes.
Final rept.,
D. Homer Buck, and Richard J. Baur. Apr 80, 130p UILU-WRC-80-0151, W80-06034, OWRT-A-083-ILL(4)
Contract DI-14-34-001-8015
Prepared in cooperation with Illinois Natural History Survey, Urbana.

This study evaluated the contributions of four Chinese carps to the biological treatment of organically polluted waters. Results established that through consumption of large quantities of organic matter, both living (plankton, bacteria) and dead (detritus, feces), the four carps in proper densities can signficiantly improve the quality of organically polluted waters and that properly designed systems would have practical application for small communities, livestock producers, and food processors. Four Chinese carps were added to the four oxidation ponds receiving swine wastes.

2D. Agronomy and Horticulture

CENA-BC-044 PC **A03**/MF **A01**
Centro de Energia Nuclear na Agricultura, Piracicaba (Brazil).
Effect of Organic Matter and of a Nitrification Inhibitor in the Absorption of a exp 15 NH sub 4+ and exp 15 NO sub 3- by Maize.
S. M. T. Saito, and A. M. L. Neptune. 7 Feb 77, 50p
In Portuguese.
U.S. Sales Only.

An experiment is discussed, carried out in greenhouse, aiming at verifying the effect of exp 15 NH4 exp + and exp 15 NO sub 3- in presence or absence of organic matter, and of a nitrification inhibitor 'AM' (2-amino-4-cloro-6-metil-pyrimidine) in the mass production and nitrogen content of the plant, taken from the soil and the fertilizer. The test plant is hybrid maize 'Centralmex' and three soils of different physical and chemical characteristicas are used: 'Regossol intergrade', 'Latossol roxo' and 'Podzolizado de Lins e Marilia, var. Marilia'. (Atomindex citation 09:417837)

PB80-201536 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Statistical Research Div.
Kansas Winter Wheat Yield Estimation and Modeling (1978).
Staff rept.,
Greg A. Larsen. Sep 79, 42p

The report discusses a research effort directed toward improved methods of forecasting winter wheat yield at the field level. Reliable forecasts of the weight per head component are made in four yields in Ellsworth County, Kansas using a constrained logistic growth model. Yield estimation is done in two ways. Yield is estimated directly from grain weights obtained just before harvest and also by using a logistic growth model. The two yield estimates compare well. Data are obtained at the elevator to provide actual production. All yield estimates are higher than the derived elevator yields. A relationship between flowering date and grain weight is identified.

PB80-202138 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Statistical Research Div.
An Empirical Study of Multivariate Stratification.
Staff rept.,
Jack Nealon. Feb 80, 35p

An empirical study comparing univariate, bivariate and trivariate stratification is presented for a multipurpose survey. Results indicated that substantial variance reductions can be produced by using multivariate rather than univariate stratification.

PB80-206154 PC **A05**/MF **A01**
National Research Council, Washington, DC. Board on Agriculture and Renewable Resources.
Weather-Information Systems for On-Farm Decision Making.
Final rept.
1980, 98p
Contract USDA-53-3A96-8-00138
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, MD.

This report considers the types of weather information needed by agriculturists and forecasters, discusses who should be responsible for providing it, and types of dissemination.

2E. Animal Husbandry

PB80-201015 PC **A03**/MF **A01**
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Grass-Fed Livestock Systems: Energy and Land Resource Constraints,
David Pimentel, P. A. Oltenacu, M. C. Nesheim, John Krummel, and M. S. Allen. 1978, 38p NSF/RA-780737
Grant NSF-AER77-01581

This report assesses the potential of a 'grass-fed' livestock system for conserving energy, land, and labor resources in animal protein production. Several aspects are analyzed: (1) energy, land, and labor resource inputs, (2) quantity of animal protein produced, (3) types of livestock used, (4) quantity of grain released for other purposes, and (5) some of the environmental consequences of the change.

2F. Forestry

PB80-202161 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Proceedings of the Annual Northeastern Forest Insect Work Conference (8th). Techniques for Research, Development, and Application, Held at North Haven, Connecticut, on 1-3 April 1975.
General technical rept. (Final),
Thomas Odell, C. R. Parencia, W. J. Lewis, Thomas McIntyre, and Marjorie A. Hoy. 1976, 25p NEFES/80-87, FSGTR/NE-27

This is a report on this conference, whose theme was 'Technique for Research, Development, and Application'. It includes discussions of the pilot boll weevil eradication experiment; kairomones and their role in pest management; the gypsy moth research, development, and applications program; parasite evaluation and management; and field and laboratory identification of insect pathogens.

PB80-202195 PC **A03**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
1975 at the Northeastern Forest Experiment Station.
General technical rept. (Final).
1976, 44p NEFES/80-86, FSGTR-NE-24

This is a summary report on highlights of research activities and accomplishments by the Experiment Station in 1975.

PB80-202443 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
How to Formulate and Solve Optimal Stand Density Over Time Problems for Even-Aged Stands Using Dynamic Programming.
Forest Service general technical rept. (Final),
Chung M. Chen, Dietmar W. Rose, and Rolfe A. Leary. Jun 80, 21p FSGTR-NC-56

The report describes how dynamic programming can be used to solve optimal stand density problems when yields are given by prior simulation or by a new stand growth equation that is a function of the decision variable. Formulations of the latter type allow use of a calculus-based search procedure; they determine exact optimal residual density at each stage.

PB80-202450 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Determining Fixed and Operating Costs of Logging Equipment.
Forest Service general technical rept. (Final),
Edwin S. Miyata. Jul 80, 24p FSGTR-NC-55

The report describes and analyzes all elements of equipment cost and gives a procedure for estimating them.

PB80-202492 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Management of Spruce-Fir in Even-Aged Stands in the Central Rocky Mountains.
Forest Service research paper (Final),
Robert R. Alexander, and Carleton B. Edminster. Jul 80, 22p FSRP-RM-217

Potential production of Engelmann spruce and subalpine fir in the central Rocky Mountains is simulated for various combinations of stand density, site quality, ages, and thinning schedules. Such estimates are needed to project future development of stands managed in different ways for various uses.

PB80-202591 PC **A04**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Timber Resource of Minnesota's Northern Pine Unit, 1977.
Forest Service resource bull. (Final),
Pamela J. Jakes, and Gerhard K. Raile. Jul 80, 58p FSRB-NC-44

The fourth inventory of Minnesota's Northern Pine Unit shows a 28 percent increase in growing-stock inventory, but a 4 percent decrease in commercial forest area between 1962 and 1977. This report gives statistical highlights and contains detailed tables of forest area as well as timber volume, growth, mortality, ownership, and use.

PB80-202773 PC **A04**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
A History of the Fernow Experimental Forest and the Parsons Timber and Watershed Laboratory.
General technical rept. (Final),
George R. Trimble, Jr. 1977, 52p NEFES/80-88, FSGTR-NE-28

U.S. Forest Service timber-management research in West Virginia began in May 1934 when the Fernow Experimental Forest was established. Except for the war years in the 1940's, an ever-intensifying program of research has been carried out in both timber and watershed management. Lists of publications and personnel are appended.

PB80-203201 PC **A15**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Proceedings of the Symposium on Intensive Culture of Northern Forest Types, Held at Orono, Maine on July 20-22, 1976.
General technical rept.
1977, 350p NEFES/80-89, FSGTR-NE-29

The report describes the proceedings of the symposium on intensive culture of northern forest types.

PB80-203797 PC **A15**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Political Science.

Forest Policy Institutions and Organizations. Forest Policy Project, Module I.
Final rept.,
Greg J. Protasel. 31 Jan 80, 331p
Contract PNRC-10890602

This report gives the reader an overview of the institutions and organizations that shape forest policy in the Pacific Northwest. The report contains a listing of key forest policy issues and analysis of attitudes held by leaders in government agencies and interest groups.

PB80-203912 PC **A02**/MF **A01**
Forintek Canada Corp., Vancouver (British Columbia). Western Forest Products Lab.
A Critical Examination of the Statistical Techniques Available for Estimating Exclusion Limits from In-Grade Tests.
Technical rept.,
W. G. Warren. Jun 79, 17p TR-9, ISBN-0-86488-032-4

The strength of wood products, exhibits variability that is in general the sum of both random and non-random components. The latter can be associated with such factors as variations in the wood supply, technological innovations or other changes in processing and hence related to specific combinations of location, time and manufacturer. In this paper the relevant statistical theory is developed, and it is shown that, within this framework, and apart from exceptional circumstances, there does not seem to be a satisfactory solution to the problem. In other words, under what could be called the conventional approach, statistical theory in itself does not have the power to provide definitive answers.

PB80-203946 PC **A08**/MF **A01**
Forintek Canada Corp., Vancouver (British Columbia). Western Forest Products Lab.
Utilization of Western Canadian Hardwoods: Proceedings of Symposium Held at Prince George, British Columbia on November 21 and 22, 1979.
Special pub.,
J. A. McIntosh, and M. N. Carroll. May 80, 153p SP-2
Sponsored in part by Alberta Forest Service, Edmonton and British Columbia Ministry of Forests, Victoria.

Partial contents:
- Status of the hardwood resource;
- Past and current utilization of hardwoods--industry experience;
- Hardwood marketing challenges;
- Current trials and hardwood utilization experiments;
- Hardwood utilization and future management.

STUDSVIK-IP-78-4 PC **A04**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Development of a System for Detecting Stones in Tree Logs.
E. Dissing. May 78, 54p STU-76-5256
In Swedish.
U.S. Sales Only.

A system is described, where sources of exp 241 Am and exp 137 Cs are used to detect stones in tree-trunks or-roots. This system is thought to be useful to prevent damages to the logging processers. (Atomindex citation 10:430449)

3. ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

AD-A086 389/4 PC **A02**/MF **A01**
Stanford Univ CA Inst for Plasma Research
The Sun's Magnetic Sector Structure,
Leif Svalgaard, John M. Wilcox, Philip H. Scherrer, and Robert Howard. 26 Aug 75, 14p Rept no. SU-IPR-639
Contract N00014-67-A-0112-0068, Grant NGR-05-020-559
Supersedes report dated Aug 75, AD-A018 766. Pub. in Solar Physics, v45 p83-91 1975. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A086 391/0 PC **A02**/MF **A01**
Stanford Univ CA Inst for Plasma Research
(Three-Dimensional) Structure of the Extended Solar Magnetic Field and the Sunspot Cycle Variation in Cosmic Ray Intensity,
Leif Svalgaard, and John M. Wilcox. 22 Mar 76, 4p Rept no. SU-IPR-662
Contract N00014-76-C-0207
Supersedes report dated Mar 76, AD-A024 604. Pub. in Nature, v262 n5571 p766-768, 26 Aug 76.

No abstract available.

AD-A086 395/1 PC **A02**/MF **A01**
Stanford Univ CA Inst for Plasma Research
The Mean Magnetic Field of the Sun: Observations at Stanford,
Philip H. Scherrer, John M. Wilcox, Leif Svalgaard, Thomas L. Duvall, Jr., and Phil H. Dittmer. 29 Apr 77, 14p Rept no. SU-IPR-682
Contract N00014-76-C-0207, Grant NGR-05-020-559
Supersedes report dated Apr 77, AD-A040 654. Pub. in Solar Physics, v54 p353-361 1977.

No abstract available.

AD-A086 396/9 PC **A02**/MF **A01**
Stanford Univ CA Inst for Plasma Research
The Hale Solar Sector Boundary,
Leif Svalgaard, and John M. Wilcox. 26 Mar 76, 14p Rept no. SU-IPR-661
Contract N00014-76-C-0207, Grant NGR-05-020-559
Supersedes report dated Mar 76, AD-A024 605. Pub. in Solar Physics, v49 p177-185 1976.

No abstract available.

AD-A086 397/7 PC **A02**/MF **A01**
Stanford Univ CA Inst for Plasma Research
Comparison of H-Alpha Synoptic Charts with the Large-Scale Solar Magnetic Field as Observed at Stanford,
Thomas L. Duvall, Jr., John M. Wilcox, Leif Svalgaard, Philip H. Scherrer, and Patrick S. McIntosh. 31 May 77, 11p Rept no. SU-IPR-700
Contract N00014-76-C-0207, Grant NGR-05-020-559
Supersedes report dated May 77, AD-A043 336. Pub. in Solar Physics, v55 p63-68 1977.

No abstract available.

AD-A086 398/5 PC **A02**/MF **A01**
Stanford Univ CA Inst for Plasma Research
An Observational Search for Solar Pulsations at Periods from Seven to Seventy Minutes,
Phil H. Dittmer. 1 Sep 77, 14p Rept no. SU-IPR-708
Contract N00014-76-C-0207, Grant NGR-02-020-559
Supersedes report dated Aug 77, AD-A047 841. Pub. in Astrophysical Jnl., v224 n1 pt 1 p265-275, 15 Aug 78.

No abstract available.

AD-A086 442/1 PC **A03**/MF **A01**
Stanford Univ CA Inst for Plasma Research
A View of Solar Magnetic Fields, the Solar Corona and the Solar Wind in Three Dimensions.
Technical rept.,
John M. Wilcox, and Leif Svalgaard. Jan 78, 29p Rept no. SU-IPR-725
Contract N00014-76-C-0207, Grant NGR-05-02-559

In the last few years it was learned that the solar corona and the solar wind are three-dimensional. That is, the deviations from spherical or even cylindrical symmetry and first-order effects, that are important for our basic description and indeed physical understanding of the coronal expansion. The recognition of this simple fact has been a slow process; perhaps because it complicates the mathematical treatment. Even a quick look at the solar corona reveals a highly structured medium with large density gradients. It has long- almost for a century as a matter of fact (Bigelow, 1889)- been suggested that magnetic fields are the fundamental agent that controls the shape of the corona and determines the inner boundary conditions for the solar wind escape. Only recently have we recognized how dominant is the role of large-scale magnetic fields in determining the global structure of the solar wind. The highly successful 'SKYLAB Workshop on Coronal Holes' that was conducted last year has been important for the general acceptance of the new three-dimensional description of the structure of the corona and the interplanetary magnetic field. Zirker (1977) and Hundhausen (1977) have aptly summarized the insight resulting from this work. The present review will attempt a further synthesis based on a broader database than that available to the Workshop. We will attempt to provide a unified viewpoint recognizing that such an attempt is usually associated with a certain degree of oversimplification.

AD-A086 622/8 PC **A02**/MF **A01**
New York Univ NY Courant Inst of Mathematical Sciences
Propagation of Two-Fluid Interplanetary Shock Waves.
Philip Rosenau. 7 Jul 78, 12p AFOSR-TR-80-0484
Grant AFOSR-76-2881
Pub. in Jnl. of Geophysical Research, v84 nA10 p5897-5906, 1 Oct 79.

No abstract available.

AD-A086 817/4 PC **A02**/MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
Research on Prediction Techniques for the Time Dependence of Solar Particle Events and Geomagnetic Activity From Results of Synoptic Analysis of Solar and Interplanetary Particle, Plasma and Field Observations.
Final rept. 1 Jul 75-30 Sep 79,
E. C. Roelof, and R. E. Gold. Mar 80, 21p AFGL-TR-80-0100
Contracts N00024-78-C-5384, MIPR-FY71217900007

A total of eight scientific techniques have been investigated as an aid for prediction of solar energetic particle events and geomagnetic storms; (1) Synoptic analysis of interplanetary data; (2) H sub ALPHA synoptic charts of low coronal magnetic structure; (3) Solar wind mapping of high coronal emission longitude of solar wind plasma and large-scale interplanetary magnetic field lines; (4) Analysis of energetic particle propagation; (5) Intercomparison of data from separated spacecraft; (6) Charts of solar optical, radio and x-ray activity; (7) Synthesis of solar and interplanetary data; and (8) Integration of interplanetary radio scintillation observations. The progress made in these techniques and their applications is reviewed and evaluated. Based on these results, new recommendations are offered for prediction and operational forecasting. (Author)

IFT-P-03/78 PC **A02**/MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Visualization of Bolyai-Lobatchevsky's Geometry.
H. V. Fagundes. 1978, 15p
In Portuguese.
U.S. Sales Only.

The plane geometry of Bolyai and Lobatchevsky has physical applications, e.g. in Friedmann's cosmological model. An approach to the problem is to use Reichenbach's general result (definition of congruence) and add a prescription on the observer's position as also essential for the visualization. (Atomindex citation 10:428301)

IFT-193/75 PC **A02**/MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Early Stages of Universe.
R. Aldrovandi. Apr 75, 20p
In Portuguese.
U.S. Sales Only.

In a very simplified, descriptive way, the main trends of phenomenological cosmology are reviewed. A sketchy view of the fashionable Standard Model(1,2) is considered preliminarily; its most pretentious variant, the Symmetric Model, is then introduced. (Atomindex citation 10:428261)

IFT-194/75 PC **A02**/MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Coexistence of Galaxies and Antigalaxies in a Cluster.
R. Aldrovandi, and S. M. V. Aldrovandi. 1975, 6p
In Portuguese.
U.S. Sales Only.

It is proposed that the detection of annihilation gamma-rays coming from any region of contact between matter and antimatter would only be possible if a cluster contains both galaxies and antigalaxies. (Atomindex citation 10:428260)

INIS-mf-4398 PC **A05**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
OH/IR Stars in the Galaxy.
B. Baud. 12 Apr 78, 86p
Proefschrift (Dr.).
U.S. Sales Only.

Radio astronomical observations leading to the discovery of 71 OH/IR sources are described in this thesis. These OH/IR sources are characterized by their double peaked OH emission profile at a wavelength of 18 cm and by their strong IR infrared emission. An analysis of the distribution and radial velocities of a number of previously known and new OH/IR sources was performed. The parameter delta V (the velocity separation between two emission peaks of the 18 cm line profile) was found to be a good criterion for a population classification with respect to stellar age. (Atomindex citation 09:399823)

INIS-mf-5336 PC **A06**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Structure in Galactic Soft X-Ray Features.
J. Davelaar. 26 Jun 79, 110p
U.S. Sales Only.

Observations are described of the soft X-ray background in a part of the northern hemisphere in the energy range 0.06 - 3.0 keV. The X-ray instruments, placed onboard a sounding rocket, are a one-dimensional focusing collector with multi-cell proportional counters in the focal plane and eight large area counters on deployable panels. A description of the instruments and their preflight calibration is given. Precautions were taken to prevent UV sensitivity of the X-ray instruments. The observation program, which consisted of a number of pre-programmed slow scans, is outlined. The spectral data on the soft X-ray background in these and previous observations showed that at least two components of different temperature are present. A low-temperature component of approximately (3-10)x10 exp 5 is found all over the sky. Components of higher temperature, approximately 3x10 exp 6 K, are found in regions of soft X-ray enhancement; The North Polar Spur has been observed in two scans at the galactic latitude b=25 exp 0 and b=75 exp 0 . The X-ray ridge structure is found to be strongly energy dependent. The low-energy data (< 0.25 keV) at b=75 exp 0 reveal two separate emission features on the ridge, both probably of finite extensions (approximately equal to 0 exp 0 .5). A wider X-ray ridge (approximately equal to 10 exp 0) is observed above 0.4 keV. (Atomindex citation 11:495679)

INIS-mf-5340 PC **A10**/MF **A01**
Utrecht Rijksuniversiteit (Netherlands).
X-Ray Emission from Supernova Remnants with Particular Reference to the Cygnus Loop.
E. H. B. M. Gronenschild. 27 Jun 79, 224p
U.S. Sales Only.

Observational or theoretical results related to the study of supernova remnants (SNRs) are described. Some background information is given by reviewing the present status of our knowledge of supernovae and supernova remnants, both from theory and observations. Also the distribution of all known radio, optical, and X-ray SNRs in the Galaxy is shown and a comparison is made. The X-ray observations of the well-known X-ray SNR the Cygnus Loop are discussed in detail, and the discovery of a new X-ray emitting SNR W44 is described. Other radio sources are investigated, and the observed X-ray emission of SNRs is analyzed by using thermal spectra like exponential or bremsstrahlung spectra. The X-ray line spectrum that emerges from SNRs is described in detail. (Atomindex citation 11:495693)

INIS-mf-5415 PC **A09**/MF **A01**
Stichting Radiostraling van Zon en Melkweg, Dwingeloo (Netherlands).
Netherlands Foundation for Radioastronomy. Annual Report 1978.
1979, 197p
In Dutch.
U.S. Sales Only.

A report of the board is followed by departmental reports from the Westerbork Telescope Group, Dwingeloo Telescope Group, Computer Group, Laboratory and Central Technical Services, Astronomy Group, Administration of the Foundation/General Affairs and Personnel Council. Astronomical reports describe radio astronomical research carried out by the Foundation staff and at the Kapteyn Laboratory Groningen, Leiden Observatory, Utrecht Observatory and the Laboratorio di Radioastronomia Bologna, Italy. Progress in the extension of the synthesis radio telescope and investigations into the possibility of substantially increasing the SRT data rate for solar observations, are outlined. Appendices shows the organisational structure, the names of the employees, the operating budget, the observing facilities at Westerbork and Dwingeloo, and the publications and reports published in 1978 and related to observations made with these facilities. (Atomindex citation 11:501261)

KFKI-1979-34 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Spectrum of Daily Variations Between 50 and 200 GV.
G. Erdos, and J. Kota. Jun 79, 8p CONF-790836-7
16. international cosmic rays conference, Kyoto, Japan, 6 Aug 1979.
U.S. Sales Only.

High-rigidity cosmic ray anisotropy of solar origin is interpreted in terms of regular particle motion - without diffusion being involved - in the large-scale interplanetary magnetic field (IMF). Anisotropy appears as a result of the wavy shape of the neutral sheet separating the IMF regions of alternate polarities. Energy losses suffered by particles along various trajectories are computed to obtain the solar and sidereal daily waves expected. It is suggested that long-term variations in the spectrum of corotation can be ascribed to variations in the wave height of the neutral sheet during a solar cycle. The change of the solar diurnal vector as observed to take place in 1969 is accounted for. Also discussed are the semidiurnal and the polarity-dependent sidereal waves as well as the radial density gradient predicted. (Atomindex citation 11:503894)

KFKI-1979-41 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Imperfect Corotation as Possible Source of Semidiurnal Variation.
J. Kota. Jul 79, 7p CONF-790836-8
16. international cosmic rays conference, Kyoto, Japan, 6 Aug 1979.
U.S. Sales Only.

It is shown that imperfect corotation may give rise to second harmonic in the cosmic ray angular distribution. The resulting ratio of the second-to-first daily harmonic amplitudes is determined. The Pioneer anisotropy measurements and the Deep River first and second harmonics are used to estimate the mean free path at around 10 GeV. (Atomindex citation 11:506868)

LA-UR-80-1199 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Silver Isotopic Anomalies in Iron Meteorites: Cosmic-Ray Production and Other Possible Sources.
R. C. Reedy. 18 Apr 80, 18p CONF-800361-1
Contract W-7405-ENG-36
11. lunar and planetary science conference, Houston, TX, USA, Mar 1980.

The sources of excess exp 107 Ag observed in iron meteorites by Kaiser, Kelly, and Wasserburg (1980) are examined, with emphasis on the reactions of cosmic-ray particles with palladium. The cross sections for the production of the silver isotopes from palladium by energetic cosmic-ray particles are evaluated or estimated and used to calculate spallogenic production rates relative to that of exp 53 Mn from iron. The upper limit for the production rate of excess exp 107 Ag by galactic-cosmic-ray particles is 400 atoms/min/kg(Pd) which, over an exposure age of 10 exp 9 years, would make only 1% of the observed excesses of exp 107 Ag. Neutron-capture reactions with Pd isotopes produce mainly exp 109 Ag. Binary fission of a siderophilic superheavy element would be expected to yield more exp 109 Ag than exp 107 Ag. An intense proton irradiation in the early solar system probably would produce a lower ratio of (exp 107 Pd/ exp 108 Pd) to (exp 26 Al/ exp 27 Al) than observed in meteorites. Therefore the presence of excess exp 107 Ag in iron meteorites with large Pd/Ag ratios very likely is due to the incorporation of 6.5 x 10 exp 6 -year exp 107 Pd of nucleosynthetic origin in these meteorites. (ERA citation 05:024801)

LA-8344-T PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Solar Wind Flows Associated with Hot Heavy Ions.
E. E. Fenimore. May 80, 58p
Contract W-7405-ENG-36
Thesis.

Solar wind heavy ion spectra measured with the Vela instrumentation have been studied with the goal of determining the solar origins of various solar wind structures which contain anomalously high ionization states. Since the ionization states freeze-in close to the sun they are good indicators of the plasma conditions in the low and intermediate corona. Heavy ion spectra from three different periods throughout the solar cycle have been analyzed. These data are consistent with freezing-in temperatures ranging from approx. 1.5 x 10 exp 6 K to higher than 9 x 10 exp 6 . The spectra indicating hot coronal conditions occur in roughly 1/7 of all measurements and almost exclusively in post-shock flows (PSFs), nonshock related helium abundance enhancements (HAEs), or non-compressive density enhancements (NCDEs). The PSFs and HAEs are both probably interplanetary manifestations of solar flares. The observation of several flare-related HAEs which were not preceded by an interplanetary shock suggests that the flare-heated plasma can evolve into the solar wind without producing a noticeable shock at 1 AU. The NCDEs with hot heavy ions differ from the PSF-HAEs in several ways implying that they evolve from events or places with lower temperatures and less energy than those associated with the flares, but with higher temperatures and densities than the quiet corona. Active regions, coronal mass ejections, and equatorial streamers are possible sources for the NCDEs with spectra indicating hot coronal conditions. These events owe their enhanced densities to coronal processes as opposed to interplanetary dynamical processes.

Models of the solar wind expansion demonstrate how some NCDEs can have extreme, nonequilibrium ionization distributions. (ERA citation 05:024796)

MPI-PAE/Astro-185 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Physik und Astrophysik, Munich (Germany, F.R.).
Possible Vacuum Signature in the Spectra of X-Ray Pulsars.
J. Ventura, W. Nagel, and P. Meszaros. May 79, 18p
U.S. Sales Only.

The vacuum polarization effect expected in the strong magnetic fields of pulsars should dominate the behavior of the opacities and the radiative transfer at X-ray frequencies. A sharp feature in the cross sections, which is peculiar to vacuum effects, is present at the frequency h-bar omega sub 0 3(4 x 10 exp 12 G/B) (n/sub e//10 exp 22 cm exp -3) exp 1 / exp 2 keV. In a radiative transfer calculation for a simplified model atmosphere, these cross sections give rise to a line feature at this frequency, additional to the cyclotron feature. This should serve as a diagnostic for the presence of vacuum effects, as well as for the determination of the plasma density. The degree of polarization expected as a function of frequency is also discussed. (Atomindex citation 11:503943)

MPI-PAE/Astro-193 PC **A06**/MF **A01**
Max-Planck-Inst. fuer Physik und Astrophysik, Munich (Germany, F.R.).
X-Rays from Neutron Stars.
G. Boerner. Aug 79, 101p
U.S. Sales Only.

The basic theoretical concepts in the models of regularly pulsating X-ray sources are discussed, and put in relation to the observations. The topics covered include physics of the magnetosphere of an accreting neutron star, hydrodynamics of the accretion column, and physical processes close to the surface of the neutron star such as proton-electron collisions and photon-electron interactions. (Atomindex citation 11:503879)

N80-27915/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
X-Ray Spectral Constraints on the Broad-Line Cloud Geometry of NGC 4151.
S. S. Holt, R. F. Muchotzky, R. H. Becker, E. A. Boldt, and P. J. Serlemitsos. Jun 80, 17p NASA-TM-80726
Submitted for Publication.

X-ray spectral data from NGC 4151 taken with the Einstein Solid-State Spectrometer (SSS) and the HEAO-1 A-2 experiment cannot be simply reconciled with absorption from a uniform column of cold gas. The SSS data can, however, be explained in terms of a clumped absorber with approximately 10% uncovered fraction and factor-of-two overabundances in Z equal to or greater than 14 elements relative to solar oxygen. It is shown that these and previously reported spectral and variability data can be quantitatively reconciled with absorption arising in the cold clouds responsible for the broad optical line emission if the cloud dimensions are small compared to the central source size. It is suggested that the lack of significant X-ray absorption observed from much higher luminosity Seyferts and quasars is a natural consequence of our picture for NGC 4151.

N80-28271/8 PC **A02**/MF **A01**
Texas Univ., Austin.
Observations of Emission Lines in M Supergiants.
Final Report.
D. L. Lambert. 1 Aug 79, 5p NASA-CR-163359
Grant NSG-5005

Copernicus observations of Mg 2 h and k emission lines from M giants and supergiants are described. Supergiants with extensive circumstellar gas shells show an asymmetric k line. The asymmetry is ascribed to superimposed lines of Fe 1 and Mn 1. The Mg 2 line width fit the Wilson-Bappu relation derived from observations of G and K Stars. Results of correlated ground-based observations include (1) the discovery of K 1 fluorescent emission from the Betelgeuse shell; (2) extimates of the mass-loss rates; and (3) the proposal that silicate dust grains must account for the major fraction of the Si atoms in the Betelgeuse shell.

N80-28272/6 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
A Solar Extreme Ultraviolet Telescope and Spectrograph for Space Shuttle. Volume 1: Investigation and Technical Plan.
W. M. Neupert. Nov 78, 58p NASA-TM-80643

A scientific investigation of heating and mass transport in the solar corona that is currently planned for a future Shuttle/Spacelab flight is outlined. The instrument to be used is a near-normal incidence grating spectrograph fed by a grazing incidence Wolter Type 2 telescope. A toroidal grating design provides stigmatic images of the corona up to 8 arc min in extent over the spectral region from 225 A to 370 A. Spatial resolution of at least 2 arc sec and spectral resolution of 0.050 A is achievable throughout the central 4 arc min field or view. Primary scientific data are recorded on Schumann-type film. An H-alpha slit jaw monitor and zero order extreme ultraviolet monitor are also planned to support instrument operation.

N80-28273/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Iue Observations of a Luminous M Supergiant That Exhibits Intense Continuum in the Far Ultraviolet.
A. G. Michalitsianos, M. Kafatos, and R. W. Hobbs. Apr 80, 21p NASA-TM-80681
Submitted for Publication.

Observations of the late type M supergiant TV Gem (M1Iab) reveal strong UV continuum between 1200 A and 3200 A. The continuum is essentially featureless with the exception of a number of broad absorption features in the short wavelength spectra range. An absorption feature centered around 1400 A could be due to Si IV absorption found typically in spectra of middle B type stars. UV emission from this star is unexpected because earlier ground-based observations give no indication of a possible association with an early companion or circumstellar ionized nebulosity. A B9 or A1 III - IV type star approximately 2to 3 magnitudes fainter than the M star could explain the level of UV continuum observed, but a fully self consistent explanation that includes the B-V color index of TV Gem is not as yet possible. The continuum flux dependence with wavelength in the UV spectral range could be attributed to a high energy source such as an accretion disc. It is suggested TV Gem is a good candidate for HEAO-2 (Einstein) satellite observations because a high energy object in close proximity to the M star would likely be a source of soft X-ray emission.

N80-28279/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Nature of Type 1 Supernovae.
I. S. Shklovskiy. Jun 80, 37p NASA-TM-76238, PR-395
Contract NASW-3199
Transl. Into English of "O Prirode Sverhnovykh I Tipa", Rept. Pr-395 Acad. Of Sci. USSR, Inst. Of Space Res., Moscow, 1978 p 1-42. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The nature of type 1 supernovae (SN 1) is discussed through a comparison of observational evidence and theoretical perspectives relating to both type 1 and 2 supernovae. In particular two hypotheses relating to SN 1 phenomenon are examined: the first proposing that SN 1 are components of binary systems in which, at a comparatively late stage of evolution, overflow of the mass occurs; the second considers pre-SN 1 to be recently evolved stars with a mass greater than 1.4 solar mass (white dwarfs). In addition, an explanation of the reduced frequency of flares of SN 1 in spiral galaxies as related to that in elliptical galaxies is presented.

N80-28280/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
New Method for Determining the Distances to Certain Extragalactic Radio Sources.
Y. A. Kovalev. Jun 80, 15p NASA-TM-76209, PR-325
Contract NASW-3198
Transl. Into English of "Novyy Metod Operdeleniye Rasstoyaniy Do Nekotorykh Vnegalikticheskikh Radiostochnikov", Rept. Pr-325 Acad. Of Sci. USSR, Inst. Of Space Res., Moscow, 1977 p 1-15. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The structural evolution of variable radio sources is examined in the Hedgehog model. It is shown that the time evolution of the angular separation of two components is described by the ellipse equation.

N80-28285/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Synoptic Observations of Jupiter's Radio Emissions: Average Statistical Properties Observed by Voyager.
J. K. Alexander, T. D. Carr, J. R. Thieman, J. J. Schauble, and A. C. Riddle. Jun 80, 43p NASA-TM-80717
Submitted for Publication.

Observations of Jupiter's low frequency radio emissions collected over one month intervals before and after each Voyager encounter were analyzed. Compilations of occurrence probability, average power flux density and average sense of circular polarization are presented as a function of central meridian longitude, phase of Io, and frequency. The results are compared with ground based observations. The necessary geometrical conditions are preferred polarization sense for Io-related decametric emission observed by Voyager from above both the dayside and nightside hemispheres are found to be essentially the same as are observed in Earth based studies. On the other hand, there is a clear local time dependence in the Io-independent decametric emission. Io appears to have an influence on average flux density of the emission down to below 2 MHz. The average power flux density spectrum of Jupiter's emission has a broad peak near 9MHz. Integration of the average spectrum over all frequencies gives a total radiated power for an isotropic source of 4 x 10 to the 11th power W.

N80-28286/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Shuttle Program. Solar Activity Prediction of Sunspot Numbers, Predicted Solar Radio Flux.
G. G. Johnson, and S. R. Newman. Feb 80, 42p NASA-TM-81109, JSC-16390

A solar activity prediction technique for monthly mean sunspot numbers over a period of approximately ten years from February 1979 to January 1989 is presented. This includes the predicted maximum epoch of solar cycle 21, approximately January 1980, and the predicted minimum epoch of solar cycle 22, approximately March 1987. Additionally, the solar radio flux 10.7 centimeter smooth values are included for the same time frame using a smooth 13 month empirical relationship. The incentive for predicting solar activity values is the requirement of solar flux data as input to upper atmosphere density models utilized in mission planning satellite orbital lifetime studies.

N80-28287/4 PC **A02**/MF **A01**
Stanford Univ., Calif. Inst. for Plasma Research.
Coronal Heating by Stochastic Magnetic Pumping.
P. A. Sturrock, and Y. Uchida. Jun 80, 19p
NASA-CR-163356, SU-SUIPR-809
Contracts NGL-05-020-272, N00014-75-C-0673
Submitted for Publication.

Recent observational data cast serious doubt on the widely held view that the Sun's corona is heated by traveling waves (acoustic or magnetohydrodynamic). It is proposed that the energy responsible for heating the corona is derived from the free energy of the coronal magnetic field derived from motion of the 'feet' of magnetic field lines in the photosphere. Stochastic motion of the feet of magnetic field lines leads, on the average, to a linear increase of magnetic free energy with time. This rate of energy input is calculated for

a simple model of a single thin flux tube. The model appears to agree well with observational data if the magnetic flux originates in small regions of high magnetic field strength. On combining this energy input with estimates of energy loss by radiation and of energy redistribution by thermal conduction, we obtain scaling laws for density and temperature in terms of length and coronal magnetic field strength.

N80-28288/2 PC **A04**/MF **A01**
Lockheed Missiles and Space Co., Palo Alto, CA.
Rocket Studies of Solar Corona and Transition Region.
Final Report, Mar. 1976 - Aug. 1979.
L. W. Acton, E. C. Bruner, Jr., W. A. Brown, and R. A. Nobles. Sep 79, 55p NASA-CR-160001
Contract NAS2-9181

The XSST (X-Ray Spectrometer/Spectrograph Telescope) rocket payload launched by a Nike Boosted Black Brant was designed to provide high spectral resolution coronal soft X-ray line information on a spectrographic plate, as well as time resolved photo-electric records of pre-selected lines and spectral regions. This spectral data is obtained from a 1 x 10 arc second solar region defined by the paraboloidal telescope of the XSST. The transition region camera provided full disc images in selected spectral intervals originating in lower temperature zones than the emitting regions accessible to the XSST. A H-alpha camera system allowed referencing the measurements to the chromospheric temperatures and altitudes. Payload flight and recovery information is provided along with X-ray photoelectric and UV flight data, transition camera results and a summary of the anomalies encountered. Instrument mechanical stability and spectrometer pointing direction are also examined.

N80-28289/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The X-Ray Spectrum of Qso 0241+622.
D. M. Worrall, E. A. Boldt, S. S. Holt, and P. J. Serlemitsos. Feb 80, 27p NASA-TM-80645
Submitted for Publication.

Proportional counters on the OsO-8 spacecraft measured the X-ray spectrum of QSR 0241+622 in the range 2-50 keV. The best power law fit has a proton spectral index and 90 percent errors gamma = 1.93 (+0.5, -0.3) and low energy absorption consistent with reported gas column densities, but a thermal bremsstrahlung form with temperature 13.1 keV cannot be excluded. No indication of spectral variability is found in three observations of the source with HEAO-A2, although a possible 15-30 percent intensity change over a period of 6 months was observed. The quasar is similar to 3C 273 in the proportion of energy emitted in various bands, excluding the radio, if reported radiation above 50 keV from its direction is indeed associated with QSO 0241+622. The two quasars are compared and possible energy generation scenarios are discussed. Implications concerning quasar contributions to the diffuse background are discussed.

N80-28290/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The HEAO A-2 Survey of Abell Clusters and the X-Ray Luminosity Function.
J. D. Mckee, R. F. Mushotzky, E. A. Boldt, S. S. Holt, and F. E. Marshall. Apr 80, 42p NASA-TM-80680
Contract NAS8-33346
Submitted for Publication.

The HEAO A-2 all sky data base was surveyed for 2-10KeV X-ray emission from the 225 Abell clusters og galaxies listed in Abell's (1958) catalof which are of distance class four or less, and are within the fraction of the sky surveyed completely by Abell. Thirty-two identifications of clusters with X-ray sources were made, for which 2-10 KeV fluxes and 90% error boxes are presented. Twelve of these identification are new. The X-ray luminosity function was derived for this statistically complete sample and the best exponential fit was found to be f(L) = 20.2 x 10 to the minus 8 power exp (-l(44)/1.9) per cu Mpc 2-10KeV. The relationship between X-ray luminosity and richness was examined and a correlation was found for richness classes 0, 1, and 2. The relationship of X-ray luminosity, Bautz-Morgan type, and Rood-Sastry type was examined. It was found that BM type I's and RS type cD and B have the greatest average luminosity. The contribution of clusters to the X-ray background was calculated from the luminosity function and was found to be 5%, and with 90% certainty, less than 8% in the 2-10 KeV band pass.

PB80-201270 Not available NTIS
National Bureau of Standards, Washington, DC.
Outer Atmospheres of Cool Stars. VI. Models for Epsilon Eridani Based on IUE Spectra of C II, Mg II, Si II, and Si III.
Final rept.,
T. Simon, W. L. Kelch, and J. L. Linsky. 1 Apr 80, 10p
Contract NAS5-23274, Grant NGL-06-003-057
See also PB80-178387.
Pub. in the Astrophysical Jnl. 273, n1 p72-81, 1 Apr 80.

Observations of the ultraviolet line spectrum of the active chromosphere star, epsilon Eridani, obtained with the IUE satellite have been analyzed. The authors have solved the coupled statistical equilibrium and radiative transfer equations for the prominent transitions of C II, Mg II, Si II, and Si III. A satisfactory fit to all of the line strengths can be achieved with a model similar to that recently proposed to explain bright points on the quiet Sun.

PB80-203052 Not available NTIS
National Bureau of Standards, Washington, DC.
Recommended Rest Frequencies for Observed Interstellar Molecular Transitions.
Final rept.,
F. J. Lovas, L. E. Snyder, and D. R. Johnson. Nov 79, 30p
Pub. in The Astrophysical Jnl., Supplement Series 41, p451-480 Nov 79.

The most accurate values presently available for the rest frequencies of all known interstellar molecular transitions are presented and recommended for reference in future astronomical observations in the radio and microwave regions. The recommended values have been carefully selected after critical evaluation of the spectroscopic literature. Probable error limits along with the proper molecular and quantum mechanical labels are presented for each observed transition. Representative line antenna temperatures are also presented for a typical source as a convenience to users. References are cited to both the astronomical and the laboratory literature.

RRK-78-10 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Anisotropic and Homogeneous Cosmological Models in the Renormalized Theory of Gravitation.
K. Tomita, T. Azuma, and H. Nariai. Mar 78, 23p
U.S. Sales Only.

The evolution of anisotropic cosmological models of Bianchi type I in the renormalized theory of gravitation is investigated. Only the models which tend in the last expanding phase to those in the einstein theory are considered. It is shown that the models with the bouncing point t sub(b) have always another extremal point t sub(e) before t sub(b) and that, as the relative degree of anisotropy at t sub(b) increases, the interval of the contracting phase (t sub(e)<t<t sub(b)) decreases and, if anisotropy becomes dynamically effective, the models have no contracting phase. (Atomindex citation 10:428414)

RRK-78-13 PC **A03**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Development of Primordial Black Holes, (2). Collisions.
A. V. Byalko. May 78, 32p
U.S. Sales Only.

Primordial black holes (PBHs) are assumed to be originated at a moment of time of order of the Planck one t sub(pl) -- 10 exp -43 s. Then the gravitational accretion, the capture collisions and the quantum evaporation of PBH's determine an evolution of the PBH mass distribution function and the rate of the cosmic expansion. It was found by analytic and computer calculations that mainly two parameters, namely zeta sub 0 <<1 -the ratio of the initial number of PBH's to the initial entropy of the universe- and K- a factor of order of unity before the integral of collisions- are of value for this cosmological model. Taking into consideration the observed baryon to radiation ratio alpha sub(obs) = 10 exp -8 one obtains that the end of the PBH-dominant era was at the moment t sub(fin) -- alpha sub(obs)sup(-9/4)t sub(pl) and the greatest PBH's evaporated earlier than t sub(max) -- alpha sub(obs)sup(-27/4)t sub(pl) -- 10 exp 11 s. The spectrum of PBH masses in the case K<1 was found to be exponential and stable to a change of initial conditions. (Atomindex citation 10:428283)

TRITA-EPP-78-11 MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik.
Observations and Hypotheses in Cosmology.
H. Alfven. May 78, 31p
U.S. Sales Only. Microfiche copies only.

The existing observational material of cosmological significance is reviewed. It is found that because of the general acceptance of the Big Bang hypothesis a large number of ad hoc assumptions have been made in order to accomodate the observational facts into its framework. Discriminating between speculative conclusions and conclusions which can be drawn with a reasonable degree of certainty, it is found that no convincing proof of the Big Bang hypothesis exists today. (Atomindex citation 10:428263)

UCID-18331 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Astrophysical Research at Lawrence Livermore Laboratory, Proposal for a Formal Program.
W. A. Lokke, and C. B. Tarter. Dec 79, 19p
Contract W-7405-ENG-48

Basic research is often characterized as self-directed, moving on its own timescale, spurred by the unexpected. An effective, organized basic astrophysics research program does not have to be a contradiction in terms. A broadly chartered, long-range LLL Astrophysics Research Program, created and recognized by LLL management, can benefit the general scientific community, stimulate the staff, maintain important capability, and enrich the Laboratory. (ERA citation 05:009399)

UCRL-83295(Rev.1) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Preferential Acceleration in Collisionless Supernova Shocks.
K. Hainebach, D. Eichler, and D. Schramm. 11 Sep 79, 7p CONF-790836-5(Rev.1)
Contract W-7405-ENG-48
16. international cosmic rays conference, Kyoto, Japan, 6 Aug 1979.

The preferential acceleration and resulting cosmic ray abundance enhancements of heavy elements (relative to protons) are calculated in the collisionless supernova shock acceleration model described by Eichler in earlier work. Rapidly increasing enhancements up to several tens times solar ratios are obtained as a function of atomic weight over charge at the time of acceleration. For material typical of hot phase interstellar medium, good agreement is obtained with the observed abundance enhancements. (ERA citation 05:009400)

UCRL-83646 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Solubility Considerations at the Center of Jupiter.
B. J. Alder, and E. L. Pollock. 20 Nov 79, 5p CONF-790709-18
Contract W-7405-ENG-48
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

The separation of helium from hydrogen at the center of Jupiter is not likely even though phase

separation is predicted at both higher and lower pressures. (ERA citation 05:007711)

WIS-Ph-78/11 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
Orbital Variations of the Optical Polarization in Cygnus X-1.
M. Milgrom. 1978, 10p
U.S. Sales Only.

The recent observations of the orbital variations of the optical polarization in Cyg X-1 are examined. It is shown that the value of the inclination angle, i, cannot be determined from the data without assuming a detailed model for the mechanism which produces the polarization. The value of i approximately 76 exp 0 which was suggested on the basis of preliminary analysis is not, in fact, implied by the data. The data are consistent with a geometry which is mirror symmetric about the plane which is perpendicular to the orbital plane and contains the centers of the stars. The suppression of the U-band variations is interpreted as a photospheric effect. The larger Balmer opacity for most of the photons in the U-band reduces their chances of scattering in the photosphere and hence their polarization is smaller. (Atomindex citation 10:428369)

WIS-Ph-78/16 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
Nature of the Galactic Bulge X-Ray Sources.
M. Milgrom. 1978, 13p
U.S. Sales Only.

A model is proposed for the class of galactic X-ray sources which include: the galactic bulge sources, the globular cluster sources, Sco X-1, Cyg X-2 and possibly, the steady components of X-ray bursters. The view is expressed that these sources are binaried containing a late type, low mass primary. The compact object has a negligible magnetic field. The accretion disc then extends down to the surface of the compact object. The resulting X-ray emission is highly non-isotropic with intensity which decreases with the inclination angle of the observer. The model reproduces the main observable properties of the sources under consideration: a. No X-ray pulsations. b. Rare occurrence of eclipses. c. Soft X-ray spectrum. d. Lower than expected ratios of optical to X-ray luminosities. The main predictions of the model are: 1. Eclipses will be observed preferentially in low luminosity sources. 2. The observed X-ray luminosity will anti-correlate with the amplitudes of the orbital, optical, light and velocity curves. 3. The observed X-ray luminosity will anti-correlate with the linear X-ray polarization. Sco X-1 and Cyg X-2 were also studied and some properties of these systems which may apply to the class as a whole are pointed out. (Atomindex citation 10:428368)

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A086 315/9 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
An Experiment for Measuring Heavy Cosmic Ray Spectra.
R. C. Filz, Y. V. Rao, and A. Davis. 1980, 7p
Rept no. AFGL-TR-80-0187
Pub. in Solid State Nuclear Track Detectors. p1021-1025 1980.

No abstract available.

AD-A086 319/1 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
The Generalized Geometrical Factor of Particle Telescopes for Trapped Radiations,
P. S. Young, E. G. Holeman, D. R. Parsignault, M. P. Hagan, and R. C. Filz. 1980, 8p Rept no. AFGL-TR-80-0188
Pub. in Conference Papers of International Cosmic Ray Conference (16th) v3 code MG2-7 p1-6 Aug 79.

No abstract available.

AD-A086 420/7 PC **A03**/MF **A01**
McDonnell Douglas Astronautics Co Huntington Beach CA
Plasma Field Studies during Magnetic Disturbances.
Final rept. Aug 79-Jun 80,
W. P. Olson, K. A. Pfitzer, and S. J. Scotti. 30 Jun 80, 39p
Contract N00014-79-C-0791

This work summarizes the work performed during the contract period. The goal was the development of quantitative disturbed-time magnetic and electric field in the magnetosphere. The July 29, 1980 event was the model disturbance used to develop a realistic magnetic and electric field model for a disturbed period. (Author)

AD-A086 631/9 PC **A02**/MF **A01**
Utah State Univ Logan Center for Atmospheric and Space Sciences
Effect of Displaced Geomagnetic and Geographic Poles on High-Latitude Plasma Convection and Ionospheric Depletions,
J. J. Sojka, W. J. Raitt, and R. W. Schunk. 18 Apr 79, 11p AFGL-TR-80-0199
Contract F19628-79-C-0025, Grant NSF-ATM78-10501
Pub. in Jnl. of Geophysical Research, v84 nA10 p5943-5951, 1 Oct 79.

No abstract available.

AD-A086 632/7 PC **A02**/MF **A01**
Utah State Univ Logan Center for Atmospheric and Space Sciences
Atomic Nitrogen and Oxygen Ions in the Daytime High-Latitude F Region,
R. W. Schunk, and W. J. Raitt. 24 Jul 79, 20p AFGL-TR-80-0198
Contract F19628-79-C-0025, Grant NSF-ATM78-10501
Pub. in Jnl. of Geophysical Research, v85 nA3 p1255-1272, 1 Mar 80.

No abstract available.

AD-A086 633/5 PC **A02**/MF **A01**
Utah State Univ Logan Center for Atmospheric and Space Sciences
High Latitude Plasma Convection: Predictions for EISCAT and Sondre Stromfjord,
J. J. Sojka, W. J. Raitt, and R. W. Schunk. 23 Jul 79, 6p AFGL-TR-80-0200
Contract F19628-79-C-0025, Grant NSF-ATM78-10501
Pub. in Geophysical Research Letters, v6 n11 p877-880 Nov 79.

No abstract available.

AD-A086 728/3 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Auroral Electrodynamics I: 1. Preliminary Electron Density Profile and 2. Vehicle Potential Changes During an Active Beam Experiment.
Memorandum rept.,
D. N. Walker, J. C. Holmes, and E. P. Szuszczewicz. 19 May 80, 16p NRL-MR-4229, AD-E000 455

The report presents preliminary findings obtained by a pulsed plasma probe aboard a payload launched by a Terrier-Malemute sounding rocket from the Poker Flat Research Range. Results are outlined both during passive and active (i.e., an Argon plasma gun) experiments. Modifications to the design of the pulsed probe circuitry which allow tracking of the vehicle potential are described. The vehicle potential deduced from the analog records is plotted during times of interest (gun pulsing periods). An electron density profile with gun pulsing times indicated is also provided. (Author)

AD-A086 732/5 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Experiments on the Junction of Relativistic Electron Beams into Preformed Channels in the Atmosphere: A Feasibility Study.
Memorandum rept.,
M. Raleigh, J. D. Sethian, R. B. Fiorito, L. Allen, and R. F. Fernsler. 13 May 80, 49p NRL-MR-4220, AD-E000 452

A study was made of the interaction of an intense relativistic electron beam (REB) with a preformed reduced density channel in the atmosphere. The channel was designated by laser-induced, aerosol-initiated air-breakdown and was heated by passage of an electric current. However, at the time the REB was injected into the channel no externally applied heating current remained. By varying the time between creation of the hot channel and injection of the REB, we were able to observe interactions of the beam with both high conductivity and low conductivity channels. In the former case the beam did not propagate in the channel, whereas in the latter case the beam did propagate in the channel. These results are discussed in terms of the residual conductivity in the channel, and in terms of the radius of the return current distribution compared to that of the beam.

AD-A086 789/5 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Influence of Magnetic Shear on the Current Convective Instability in the Diffuse Aurora.
Memorandum rept.,
J. D. Huba, and S. L. Ossakow. 16 Apr 80, 23p NRL-MR-4219, AD-E000 443

The influence of magnetic shear on the current convective instability is investigated for conditions typical of the high latitude F region during the diffuse aurora. It is found that magnetic shear (1) reduces the growth rate of the instability (although it does not stabilize the mode); and (2) substantially localizes the mode structure parallel to the density gradient.

AD-A086 809/1 PC **A04**/MF **A01**
Epsilon Labs Inc Bedford MA
Satellite Density Gauge Instrumentation Program.
Final rept. 11 Jan 77-30 Dec 78,
Carl A. Accardo, and John Dulchinos. Jan 80, 72p AFGL-TR-80-0036
Contracts F19628-77-C-0062, F19828-74-C-0156
See also Rept. no. AFGL-TR-76-0271, AD-A034 428.

The report contains a description of a U.S. Air Force Geophysics Laboratory Atmosphere Density experiment. Two instruments developed under an earlier program were qualified for space flight and were flown in the spring of 1978. Discussion of instrument performance and flight results are presented. (Author)

AD-A086 839/8 PC **A03**/MF **A01**
Tufts Univ Medford MA Dept of Electrical Engineering
Payloads Used in First Three Data-Gathering BAMM Flights,
Alvin H. Howell. Jan 80, 30p SCIENTIFIC-3, AFGL-TR-80-0109
Contract F19628-77-C-0047

Payloads were configured for, and used in, three successful data-gathering balloon flights for the Balloon Altitude Mosaic Measurements (BAMM) program. All were significantly different, and each worked as planned. A radiometer and a TV camera were carried on Flight 1, and an interferometer was added for Flights 2 and 3. Recovery was by ground impact for the first two flights, but the third was snatched from the air by helicopter. (Author)

AD-A086 861/2 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Comparison of Results from the S3-2 Satellite and the Chatanika Radar in an Early Morning Aurora.
Environmental research paper,
Roger P. Vancour, and Bertram M. Shuman. 22 Oct 79, 18p Rept nos. AFGL-TR-79-0254, AFGL-ERP-680

During orbit 6352, the Air Force satellite S3-2 passed by the Chatanika radar in a trajectory that

was only 12 deg off from the geomagnetic meridian along which the radar scanned. This report presents the analysis of the data for this orbit from the triaxial fluxgate magnetometer, the electrostatic analyzer aboard the satellite, and the radar data. These data were obtained simultaneously during a morning active aurora. Comparisons of current densities determined by these experiments are made, and the agreement between the electrostatic analyzer precipitating electron fluxes and the electron densities determined from the radar data is shown. (Author)

AD-A086 863/8 PC **A04**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Optical Turbulence Forecasting: A Tutorial.
Environmental research paper,
Edmond M. Dewan. 22 Jan 80, 69p Rept nos. AFGL-TR-80-0030, AFGL-ERP-694

This report is a tutorial on the effects of atmospheric turbulence upon systems which rely upon the propagation of LASER beams. In addition to providing a simplified presentation of turbulence theory and optical effects, it describes the state of the art of the new technique of radiosonde estimation of index of refraction fluctuations. suggestions are given for future research which will help to answer current Air Force needs. The feasibility of some laser systems will depend upon the value of r sub o, the coherence length (which is related to C sub n sq. which in turn is related to the degree of turbulence). At present, the statistics of r sub o are inadequate. (Author)

AD-A086 868/7 PC **A02**/MF **A01**
Logicon Inc Lexington MA
Condensed Storage of Diffusion Equation Solutions for Atmospheric Density Model computations,
James N. Bass. 25 Jan 80, 14p SCIENTIFIC-3, AFGL-TR-80-0038
Contract F19628-78-C-0209

It is shown that all neutral thermospheric component densities in diffusive equilibrium can be derived from a single function of height. This is used to permit considerable savings in storage of Jacchia 1977 model densities compared to storing the solution for each component, which requires use of external random access files. The single solution can be built into the computer code, making it more transportable to different computers. A subroutine has been developed implementing this method, including the latest results for atomic nitrogen and the non-diffusive equilibrium solution for atomic hydrogen. (Author)

IVL-B-500 PC **A04**/MF **A01**
Swedish Water and Air Pollution Research Lab., Stockholm.
Deposition of Particulate Emissions from a Smelter Industry.
T. Hellstroem. Sep 79, 70p
U.S. Sales Only.

A mathematical model is developed for calculating the deposition of heavy metals (Pb, Cu, Cd) from a smelter complex situated in the northern Sweden. The model is based on the Gaussian plume dispersion model with reflection at ground and inversion layer. The plume reduction is taken into account by a surface depletion model. The deposition is calculated for 4 emission sources (3 stacks and wind erosion), 3 heavy metals (Pb, Cu, Cd), 3 particle sizes, 8 directions, 4 lapse rates, 5 windspeeds, winter situations and summer situations. The calculations are worked out for distances up to 70 km from the smelter complex. Within this distance, on the average, 60% of the emission is deposited. Of this deposition about 10% is wet deposition, i.e., scavenging by rain or snow. (ERA citation 05:022913)

N80-27866/6 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
High Resolution Infrared Spectroscopy Techniques for Upper Atmospheric Measurements.
D. G. Murcray, and J. M. Alvarez. May 80, 109p NASA-CP-2134, L-13780
Workshop Held in Silverthorne Colo., 31 Jul. - 2 Aug. 1979.

No abstract available.

N80-27873/2 PC **A04**/MF **A01**
Applied Physics Lab., Johns Hopkins Univ., Laurel, MD. Dept. of Space.
Assessment of Atmospheric Height Uncertainties for High Precision Satellite Altimeter Missions to Monitor Ocean Currents.
J. Goldhirsh, and J. R. Rowland. Jun 80, 73p NASA-CR-156868, JHU/APL-SIR80U-018
NASA ORDER P-78192, Contract N00024-78-C-5384

The influence of the atmosphere on nadir directed signal associated with satellite altimeters are examined. Frequencies at 6, 13.5, and 35 GHz are selected so as to provide a parameter study. Uncertainties are summarized in both existing and proposed techniques which establish ionospheric and tropospheric height corrections. The error summary thus gives values describing the best you can do in height resolution (as dictated by atmospheric parameters) for a satellite borne altimeter system. The results presented reflect data gleaned from the literature, at large, as well as from the existing body of published literature associated with the Seasat A Altimeter Experiment. Specifically considered are: (1) the effects of precipitation on altimeter signals, (2) range errors due to refractive index variations in both the clear atmosphere (convective and nonconvective) and clouds, and (3) range errors introduced by the ionosphere. A preliminary analysis is pursued establishing the feasibility of incorporating rain rate range gates in a future satellite-borne altimeter system.

PB80-208119 PC **A03**/MF **A01**
National Environmental Satellite Service, Washington, DC.
Calculation of Atmospheric Radiances and Brightness Temperatures in Infrared Window Channels of Satellite Radiometers.
Technical rept.,
Michael P. Weinreb, and Michael L. Hill. Mar 80, 47p NOAA-TR-NESS-80, NOAA-80061301

A method of simulating measurements of atmospheric radiances and brightness temperatures in wide-band window channels (at 11 and 3.7 micrometers) of satellite radiometers is described. As input the simulation takes vertical profiles of atmospheric temperature and water-vapor mixing ratio, as well as the spectral response functions of the window channels. It models the atmospheric transmittances and integrates the equation of radiative transfer. The use of the method is demonstrated with applications to the Advanced Very High Resolution Radiometer on the TIROS-N satellite.

PNL-3083 PC **A11**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comprehensive Study of Drift from Mechanical Draft Cooling Towers. Final Report.
N. S. Laulainen, R. O. Webb, K. R. Wilber, and S. L. Ulanski. Sep 79, 233p
Contract EY-76-C-06-1830

Drift from mechanical draft cooling towers was studied to establish a data base for use in drift deposition model validation. This objective was met by the simultaneous measurement of cooling tower source emission parameters, meteorological variables and drift deposition patterns during seven of eight test runs. Results from six of these test runs are presented and discussed. Source characterization measurements were made of cooling tower emission parameters such as updraft velocity and temperature profiles, liquid and mineral mass drift emission rates, and drift droplet size distributions. The meteorological measurements included wet- and dry-bulb temperature and wind speed and direction at various heights to provide information on the vertical structure of temperature, moisture and mass transport. Surface deposition measurements included both droplet and bulk mineral mass deposition rates. Substantial variation in drift emissions were noticed. Large day-to-day variations for a given cell and large cell-to-cell variations were observed. The problem of deriving a total droplet emission spectrum and rate from one or two towers is complicated and the modeler must decide on the amount of detail he needs to satisfactorily predict downwind deposition patterns. Meteorological conditions during the drift study were characterized by relatively high winds, warm temperatures and moderate humidities. The relatively high winds increased the uncertainty in the measured deposition patterns. In spite of the large (factor of 2 or 3) uncertainty in the measured deposition rates, preliminary calculations of drift deposition rates are in agreement with each other for test run 1. Although the present study did not meet all the requirements for complete validation of various drift models, it has contributed a unique set of data for that purpose. (ERA citation 05:006821)

STUDSVIK-SM-78-6 PC **A02**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Further Development of the Sulfur-35 Method on Behalf on the National Swedish Environment Protection Board.
L. Bergstroem. Mar 78, 19p
In Swedish.
U.S. Sales Only.

A study of the method of using 35-S as a tracer for studying the wet deposition of sulfur dioxide is reported. Suitable ways of producing the tracer, procedures and equipments for injecting it, testing and analyses are reported. (Atomindex citation 10:430465)

UCID-18504 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Chabot Observatory Remote Sensing Experiments (CORSE)-Progress 1978-79.
W. M. Porch, T. R. Galloway, T. J. Green, J. O. Waidl, and P. T. Futshcer. Jan 80, 30p
Contract W-7405-ENG-48

A cooperative effort yielded several important results and new techniques for remote sensing of atmospheric parameters. An electro-optical system was developed which simultaneously analyzes regional scale atmospheric constituents such as aerosols H sub 2 0, 0 sub 2 , N0 sub 2 , and 0 sub 3 while measuring long path averaged wind and atmospheric turbulence in the San Francisco Bay Area. Future plans include improving these techniques to remotely determine vertical temperature profiles inversion heights, heat fluxes and vertical gradient wind speeds. (ERA citation 05:010534)

4B. Meteorology

AD-A086 320/9 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Estimating Probabilities of Cloud-Free Fields-of-View from the Earth through the Atmosphere,
Iver A. Lund, Donald D. Grantham, and Richard E. Davis. 20 Sep 79, 14p Rept no. AFGL-TR-80-0183
Pub. in Jnl. of Applied Meteorology, v19 n4 p452-463 Apr 80.

No abstract available.

AD-A086 651/7 Not available NTIS
Colorado State Univ Fort Collins Dept of Physics
Individual Particle Scattering and Single-Burst Digital Correlation for Remote Atmospheric Wind Measurements,
C. Y. She. 16 Jan 79, 13p
Contract N00014-78-C-0289
Availability: Pub. in Optica Acta, v26 n5 p645-657 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 781/2 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Planetary Boundary Layer Parameterization for Tropical Cyclones Based on Generalized Similarity Theory.
Memorandum rept.,
Simon Wei-jen Chang, and Rangarao V. Madala. 20 May 80, 35p NRL-MR-4235, AD-E000 460

A planetary boundary layer (PBL) parameterization based on the generalized similarity theory (GST) was developed for tropical cyclone models. This parameterization, with only one layer, is necessary in modeling tropical cyclones for computational speed. The momentum, sensible heat and mois-

ture fluxes are mutually dependent in this parameterization through non-dimensional gradient equations. The internal structure of the PBL is determined implicitly through universal functions. In comparison with a complex, one-dimensional, multi-year PBL model, the GST parameterization yields accurate moisture fluxes, but slightly overestimates the momentum flux and underestimates the sensible heat flux. The GST parameterization produces very realistic dynamics, energetics and thermal structure in an axisymmetric tropical cyclone model. This GST parameterization is judged superior to drag coefficient parameterization and is a good alternative to the more expensive, multilayer parameterization. (Author)

AD-A086 810/9 MF **A01**
New Mexico State Univ Las Cruces Dept of Electrical and Computer Engineering
The Description of the ROBIN Program and Its Conversion to the Interdata 7-32 Computer System.
Technical rept.,
M. Don Merrill, and Donald Elwell. May 80, 140p
ERADCOM/ASL-CR-80-0115-1
Contract DAAD07-76-C-0115
Availability: Microfiche copies only.

ROBIN (the operational program for computation of upper atmosphere density and other parameters from a passive inflatable falling sphere) was developed for the Air Force Cambridge Research Laboratory by the University of Dayton Research Institute in the 1960's. Its utilization was limited to the Meteorological Rocket Network ranges that had high precision radars and large capacity computers. The development of minicomputers and the deployment of Nike Hercules tracking radars at several Army meteorological rocket sites made it possible to expand the use of the ROBIN sphere to remote locations. The only remaining barrier was the adaptation of the ROBIN program to a minicomputer. This report describes the conversion of the ROBIN-UNIVAC 1108 program used by the Atmospheric Sciences Laboratory at White Sands Missile Range, New Mexico, to the Interdata 7-32 minicomputer. (Author)

AD-A086 841/4 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
A Climatological Study of the Forcing of the North Pacific Ocean by Synoptic Storm Activity.
Master's thesis,
Michael Scott Risch. Mar 80, 67p

Synoptic storm activity over the North Pacific Ocean is investigated by using a special series of six-hourly surface wind analyses prepared by Fleet Numerical Oceanographic Center (FNOC) covering the period 1969-1978. Temporal variance of the surface wind components at each grid point is 'high pass' filtered, thereby removing all temporal variability except that having time scales less than ten days. Both the total and the filtered wind components were used to calculate the cube of the friction velocity and the wind stress curl. Monthly 'climatologies' are calculated by computing ten-year averages of monthly mean cube of the friction velocity and wind stress curl from total and filtered wind components for each month of the year. It was found that while climatological maps of cube of the friction velocity calculated from filtered data show spatially coherent patterns that are clearly associated wtih monthly storm tracks, similar maps of wind stress curl do not show such coherent patterns. Maps of anomalous storm activity, as given by the difference between the monthly value and the climatological value for that month, are also prepared and qualitatively compared to observations of large scale sea surface temperature (SST) anomalies.

AD-A086 862/0 PC **A03**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Short-Range Forecasting through Extrapolation of Satellite Imagery Patterns. Part II. Testing Motion Vector Techniques.
Final rept.,
H. Stuart Muench. 10 Dec 79, 30p Rept nos.
AFGL-TR-79-0294, AFGL-ERP-685
See also Part 1, AD-A073 081.

An effort is underway at Air Force Geophysics Laboratory to develop automated procedures to make short-range (0-6 hr) terminal weather forecasts using GOES imagery data. A simple approach is to extrapolate the cloud patterns using motion vectors derived from a comparison of successive images. This report describes a test of candidate motion vector techniques using twelve cases of six successive images in a variety of weather conditions. Included in the techniques were two that track brightness centers, three that use cross-covariance, and two using winds aloft. All were compared against persistence (no motion, no change). For all time periods and all thresholds, a binary covariance technique had the highest scores but the techniques using winds aloft were very close. Also, no technique was much better than persistence. There is evidence that most (perhaps 75 percent) of the total changes occurring are not due to simple motion of the cloud patterns but due to more complex processes. (Author)

JAERI-M-7685 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Report of Meteorological Observations in Site of Tokai Research Establishment in 1971.
May 78, 56p
In Japanese.
U.S. Sales Only.

Covered are the meteorological observations from January to December 1971 in Tokai Research Establishment as monthly summaries, including daily and hourly mean wind speeds, frequencies of wind directions and atmospheric stability. (Atomindex citation 10:429970)

N80-27733/8 PC **A10**/MF **A01**
European Space Agency, Paris (France). Dept. of Application Programmes.
On Climatology, Hydrology, Atmospheric Research and Meteorology (CHARM) from Space.
T. D. Guyenne. Feb 80, 220p ESA-SP-150
Party in English and French. Sponsored in Part by Comm. Of European Communities. Proceedings of Esa Workshop on Charm, Ajaccio, France, 12-16 Nov. 1979. Original Contains Color Illustrations.

No abstract available.

N80-27914/4 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Meteorological Satellites.
L. J. Allison, A. Schnapf, B. C. Diesen, Iii, P. S. Martin, and A. Schwalb. Jun 80, 78p NASA-TM-80704
Submitted for Publication.

An overview is presented of the meteorological satellite programs that have been evolving from 1958 to the present, and plans for the future meteorological and environmental satellite systems that are scheduled to be placed into service in the early 1980's are reviewed. The development of the TIROS family of weather satellites, including TIROS, ESSA, ITOS/NOAA, and the present TIROS-N (the third generation operational system) is summarized. The contribution of the Nimbus and ATS technology satellites to the development of the operational-orbiting and geostationary satellites is discussed. Included are descriptions of both the TIROS-N and the DMSP payloads currently under development to assure a continued and orderly growth of these systems into the 1980's.

N80-27916/9 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
A Preliminary Look at AVE-Sesame 2 Conducted on 19-20 April 1979.
S. F. Williams, N. Horvath, and R. E. Turner. Jun 80, 58p NASA-TM-78280

Preliminary information on data collected, synoptic conditions, and severe and unusual weather reported during the AVE-SESAME 2 period is presented. The information provides researchers a preliminary look at conditions during the AVE-SESAME 2 period.

N80-27938/3 PC **A19**/MF **A01**
World Meteorological Organization, Geneva (Switzerland).
Climate Models: Performance, Intercomparison and Sensitivity Studies, Volume 2.
Global Atmospheric Research Programme.
W. L. Gates. Dec 79, 449p GARP-PUBL-22-V-2
Prepared in Cooperation with International Council of Scientific Unions, Rome, Italy. Proceedings of Wmo/Icsu Joint Organizing Comm. Study Conf., Washington, D.C., 3-7 Apr. 1978.

No abstract available.

PB80-200264 PC **A06**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery, August 1979.
Apr 80, 102p KMRD-5.4-7908, NOAA-80051203
See also report dated May 79, PB80-153356. Key to Meteorological Records Documentation.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to assist users in selecting data for research and climatological use.

PB80-200470 PC **A05**/MF **A01**
Texas Dept. of Water Resources, Austin.
Determination of Cloud and Precipitation Characteristics from Satellite, Radar and Raingage Analysis.
Final rept. 1 Jan 79-31 Dec 79,
Donald R. Haragan, Jerry Jurica, and Colleen A. Leary. 1 Jan 80, 79p LP-127

Data gathered during the Texas HIPLEX field programs of 1977, 1978 and 1979 are analyzed and discussed. Specific data treated are recording raingage data, digitized radar data and geostationary satellite radiance data. Individual analyses are presented as well as results derived from integration of the several data sources into a more complete case study of certain dates. It is concluded that such integration of individual analyses yields greatly improved understanding of the relevant meteorological processes.

PB80-200587 PC **A07**/MF **A01**
Texas Dept. of Water Resources, Austin.
Investigations of the Radar-Echo Climatology of Southern HIPLEX.
Final rept.,
Dennis M. Driscoll. Jan 80, 143p LP-121
Contract DI-14-06-D-7587
Prepared in cooperation with Texas A and M Univ., College Station. Dept. of Meteorology.

This study documents climatological characteristics of radar echoes in the Southern HIPLEX area, reports on the synoptic climatology of the region, develops a connection for radar bias from PPI films from the Amarillo and Midland National Weather Service WSR-57 radars (10 cm), and attempts an analysis of the effects of seeding on convective cell characteristics as deduced from radar echoes on a smaller scale than was previously possible.

PB80-200603 PC **A05**/MF **A01**
Texas Dept. of Water Resources, Austin.
Preliminary Cloud Microphysics Studies for Texas HIPLEX, 1979.
Technical rept.,
Alex B. Long. Mar 80, 84p LP-124
Contract DI-14-06-D-7587
Sponsored in part by Water and Power Resources Service, Denver, CO. Office of Atmospheric Resources Management.

Cloud microphysics studies made in connection with Texas HIPLEX 1979 are described. Any results, however, must be regarded as preliminary and subject to revision based on further work. The objective is to determine important natural precipitation mechanisms in summertime convective clouds in the Big Spring, Texas area.

PB80-204803 PC **A03**/MF **A01**
National Advisory Committee on Oceans and Atmosphere, Washington, DC.
The Agnes Floods. A Post-Audit of the Effectiveness of the Storm and Flood Warning System of the National Oceanic and Atmospheric Administration.
22 Nov 72, 42p NACOA-2

Hurricane Agnes, which battered the eastern seaboard of the United States for four days in June 1972, was an unruly storm which put to severe test the capabilities and skills of the Nation's weather and flood warning system. The Panel finds that: The overall performance of the Nation's weather and flood warning system during tropical storm Agnes can be rated as good. Though effectiveness was not uniform in all affected parts of the country, human performance must be credited with preventing critical system strains from turning into disaster. The benefit of hindsight points to some flaws and gaps in system capabilities of NOAA's storm prediction and flood data-gathering and warning system, to more serious deficiencies in the National capabilities for disseminating warnings and for anticipating public response to warnings, and to the inevitability of increased damages with inadequately regulated use of the flood plain.

PB80-208101 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Optical System Model IV for Space-Averaged Wind and Cn2 Measurements.
Technical memo.,
G. R. Ochs, and W. D. Cartwright. Mar 80, 37p
NOAA-TM-ERL-WPL-52, NOAA-80061116
Sponsored in part by Army Electronics Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.

This report describes an optical instrument that measures the path-averaged values of the refractive-index structure parameter (sq C sub n) and the crosswind over optical paths from 200 to 1500 m. An optimum path lengths of 900 to 1200 m, sq C sub n can be measured over a range for 1 x 10 to the minus 12 power to 1 x 10 to the minus 16 power/m to the 2/3rd power.

RLO-2343-78/4 PC **A04**/MF **A01**
Wyoming Univ., Laramie. Dept. of Geology.
Airflow over Part of the Southern High Plains Interpreted from LANDSAT Imagery.
J. W. Carlisle, and R. W. Marrs. Jul 78, 64p
Contract EY-76-S-06-2343

An interpretation of eolian features using remote sensing techniques for part of the Southern High Plains demonstrates the use of remote sensing as an inexpensive and easily applicable tool to assess wind-energy potential. The most useful eolian features in such an interpretation are sand dunes, blowouts, dust plumes, clay dunes, playa plumes, and playa orientation. Although the relief is low to moderate in this area, topographic channeling is the most important factor in determining high wind-energy areas. (ERA citation 05:010031)

SAND-79-2121C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Solar Radiation Model Validation.
I. J. Hall, R. R. Prairie, and E. C. Boes. 1979, 21p
CONF-791081-1
Contract EY-76-C-04-0789
DOE/Division of Distributed Solar Technology contractor's program review meeting, Bethesda, MD, USA, 30 Oct 1979.

Three solar radiation models have been used in developing the Augmented SOLMET Solar Data Tapes for the 26 SOLMET sites and the 222 ERSATZ Solar Data Tapes. One of the models, a theoretical one, predicts the solar noon radiation for clear sky conditions from the optical air mass, precipitable water vapor and turbidity variables. This model is referred to as the Clear Solar Noon Model. A second model, an empirical one, also developed by NOAA, predicts the hourly total horizontal radiation from meteorological variables. This model is referred to as the Total Horizontal Regression Model. And a third model, also an empirical one, predicts the hourly direct normal radiation from the hourly total horizontal radiation. This model is referred to as the Aerospace Direct Normal Model. A study of the accuracy of these solar radiation models is reported. To assess the accuracy of these models, data was obtained from several US National Weather Service Stations and other sources, used the models to estimate the solar-radiation, and then compared the modeled radiation values with observed radiation values. The most important results of these comparisons for these three models mentioned above are included. (ERA citation 05:006709)

UCRL-82531 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Application of Autospectral and Regression Analysis to the Study of Temporal-Spatial Variation of Winds in Complex Terrain.
W. M. Porch. 28 Jun 79, 7p CONF-791031-1
Contract W-7405-ENG-48
Conference on probability and statistics in atmospheric sciences, Banff, Alberta, Canada, 9 Oct 1979.

How many meteorological stations, where they should be placed and how often the data should be taken to characterize wind flow in complex terrain continues to be a problem for pollution transport studies as well as wind energy prospecting. A two month (June and July 1976) field study was conducted using laser anemometers (Lawrence, et al., 1976) across a windy pass (Patterson Pass) about 60 km east of San Francisco, California. These measurements were supported by data from over 50 meteorological stations throughout the Bay Area and Central Valley. Power spectral analysis was applied to the two month data period (Blackman and Tukey, 1958) for 1152 thirty minute averages and a Tapered Entropy Method (Strand, 1975) for 54 hourly averages at the minimum and maximum of the diurnal sea-breeze cycle). The results of the spectral analysis indicates an approx. 6 and approx. 12 day cycle in summer-sea breeze intensity throughout the region, as well as, pointing out fundamental differences between spacially averaged winds (such as are required by numerical models) and point wind measurements in complex terrain. (ERA citation 04:056363)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A086 505/5 PC **A06**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Annual Report on Research, 1979.
1979, 104p

Some 40 research efforts selected from ARI's 150 work units under the headings of Human Factors Education and Training, Personnel and Manpower, and Simulation have been described. The reader will note that the work described is most diverse. Potential applications of people research are almost infinite. It is also noteworthy that ARI research is in various stages of development. Some projects are beginning; others have produced and continue to provide products being used by Army agencies. International tensions drive research and development of military hardware which must be integrated into ever more powerful military systems. These systems, in turn, represent evolutions that must be anticipated, solidified, and tested. Results must then be incorporated into doctrine, training materials modifications of systems and procedures, and development of simulators for training so as to fully integrate hardware and human capabilities in total system approaches. In an international arms race, hardware developments are never-ending; people research must keep up. Finally, as more powerful and complex systems must be operated and maintained, manpower projections point to future problems of finding and keeping the dedicated personnel needed to man Army units. These problems and issues described above come to ARI as given. ARI's rules in response are to: (1) maintain and keep updated an institutional memory, (2) translate issues and problems into researchable projects, (3) conduct these projects through in-house and contractor efforts, and (4) aid and assist the Army in utilization and refinement of research products.

AD-A086 522/0 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
A Market Pricing Method for Spectrum Allocation.
Master's thesis,
Joseph Philip Woodford. Mar 80, 108p

This thesis is a study of spectrum allocation by market incentives as an alternative to the conventional block allocation scheme administered under government regulation. A description of electromagnetic radiation and a brief history of allocation introduce this study. The principal elements of concern are allocative efficiency under regulation, technology and spectrum substitutability in a user's production decision, and the problems inherent in a spectrum market, specifically, property right definition, negative externalities of spectrum use, and transaction costs. The potential of a spectrum market incorporating optimal pricing techniques similar to transportation congestion models is investigated. This study concludes by proposing a detailed mechanism for a limited spectrum market which is responsive to the user's resource input choice. (Author)

AD-A086 544/4 PC **A13**/MF **A01**
Naval Academy Annapolis MD
Summary of Research Activities. Academic Departments, 1979-1980.
Annual rept. 1 Jul 78-30 Jun 79,
Wilson L. Heflin. Oct 79, 289p Rept no. USNA-AR-5
See also AD-A067 896.

This annual report summarizes the research work of the Naval Academy faculty and midshipmen for the period 1 July 1978–30 June 1979. Sponsored and independent research projects are listed by title, followed by the names of the investigators and an abstract. A list of publications and their abstracts are included as well as presentations at professional meetings, conferences, and seminars.

AD-A086 570/9 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Analysis of Central Design Agency Alternatives for Navy Industrial Fund Accounting Systems: A Proposed Methodology.
Master's thesis,
Mark David Westin. Mar 80, 72p

The task of design, implementation, and maintenance of automated Navy Industrial Fund accounting systems is the responsibility of the Central Design Agencies that serve each of the industrial activity groups. The perception that separately maintained automated accounting systems are not cost effective has led to calls for the consolidation of central design agency functions. The objective of this thesis was to assess the methodologies available for the analysis of the consolidation alternatives. While several studies have suggested a cost-benefit approach, this study concluded that this methodology was inappropriate due to its restrictive assumptions and severe measurement problems. This study suggests 'scorecarding' as a more appropriate methodology and provides a 'pro forma' scorecard dealing with the consolidation issue. Scorecarding is a preferred alternative for dealing with the multiple and conflicting objectives and the multiple impacts that characterize the central design agency consolidation issue. (Author)

AD-A086 572/5 PC **A06**/MF **A01**
Defense Systems Management Coll Fort Belvoir VA
Defense Systems Management Review. Volume 3, Number 2, Spring 1980. Managing the Process.
1980, 112p
See also Volume 2, Number 3, AD-A074 518.

Contents: The General Manager of Matrix Organization; Staff Men Are Finks-And Other Generalizations; Goal Programming as an Aid to Resource Management; A Proposal on Acquisition Management Information; The Inefficiency of Sealed-Bid Competition; Controlled Competition for Optimal

Acquisition; Buying Commercial: What Works and What Doesn't; The Impact of Energy Costs on Acquisition Contracting; A Look at the Independence of Federal Contract Research Centers; R&D Project Marketing in the Defense Laboratories; Improving Weapons in the Fleet; MIL-STD-499A and Its Application to System Engineering.

AD-A086 625/1 PC **A05**/MF **A01**
Army Inventory Research Office Philadelphia PA
The Driver Concept for Projecting Resource Requirements: Two Pilot Tests.
Final rept.,
Donald A. Orr. Mar 80, 84p Rept no. IRO-271

Entities, whose values depend on Army policy and which drive the workload and resource requirements of Army organizations, are analyzed for the Materiel Management (MM) and Maintenance (MS) Directorates of CERCOM and TARCOM. These drivers, which are typically classes of entities such as major items, secondary items, requisitions, product improvement programs, and fielded weapon systems, vary from year to year. Man years and dollars necessary to perform functions related to the 'management' of these drivers, if such resources had been and are rationally allocated, should vary in a similar fashion. Forecasting changes in driver values over future years should allow corresponding forecasts in resource requirements to be made. The results of testing these driver concepts on the historical data bases of the four above-mentioned directorates produced mixed results. The CERCOM MS analysis produced good statistical results in the area investigated (pre-issue development). The TARCOM MS results were poor in a historical statistical sense. In the two MM directorates, the analysis indicated some functional areas where the historical trends fulfilled the postulated relations and other areas where the historical resources expended did not track the related driver values. Data availability was generally easier in the MM area.

AD-A086 626/9 PC **A03**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
Organizational Maintenance: Behavior Analysis and Intervention.
Final rept. 1 Oct 78-31 Dec 79,
Judi Komaki, and Robert L. Collins. Jun 80, 33p
Contract N00014-79-C-0011

Although the importance of preventive maintenance (PM) is widely acknowledged, there are few documented ways to improve the quality, regularity, and timeliness of maintenance. Most PM studies are not concerned with on-the-job practices; worker motivation is neglected; and there are not satisfactory measures of PM performance. One method which has been suggested as suitable for facilitating preventive maintenance is the behavior analysis approach. Based on the needs identified by Marine Corps personnel, a pilot program, based on the behavior analysis approach, was designed and implemented in a Fleet Marine Force Unit. The focus was on personnel (N=50) in the Ordnance and Motor Transport sections of a heavy artillery Battery at Camp Lejeune, NC. The Program was not only well received, but also initially effective in the Motor Transport section with all goals being exceeded by a substantial margin. However, the final results were mixed. Performance in Motor Transport declined back to preprogram levels. No improvements were ever obtained in Ordnance. The lackluster results of the program did not appear to be a function of the expertise, commitment, or competence of individual personnel. Instead, the PM Liberty Call Program, as it was designed and implemented, simply could not overcome the crisis management environment in which higher priority was placed on more visible, nonmaintenance commitments.

AD-A086 684/8 PC **A05**/MF **A01**
Polytechnic Inst of New York Brooklyn
Incentivising Availability Warranties.
Technical rept.,
Clifford Marshall. Mar 80, 89p Rept nos. POLY-EE-80-002, POLY-EER-126
Contract N00014-75-C-0858

The research reported here defies the concepts of incentivised reliability (availability) warranties, develops mathematical models of the structure of such warranties, and analyzes selected examples. The goal of the analyses is to identify and study the role of contract variables as they relate to the division of risk assumption, the improvement of reliability (availability) and the control of cost in a warranty situation. Since the research deals with reliability considerations it is carried out in a stochastic framework, where the mathematical models provide expected values and standard deviations of costs for repair/replacement as functions of time. Warranty fee pools are represented by various functional forms and different probability laws are employed to govern the failure events and times to failure.

AD-A086 879/4 PC **A03**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Use of Self-Report Technology in the Development of an Organizational Action-Research Program.
Technical rept.,
Samuel Shiflett, John R. Turney, and Stanley L. Cohen. Sep 79, 50p Rept no. ARI-TR-400

The research examined the dimensional characteristics of several self-report techniques of potential value in a diagnostic questionnaire to be used in organizational effectiveness (OE) research and intervention. A survey questionnaire administered to 320 enlisted personnel stationed in West Germany contained items for the OE-derived Work Environment Questionnaire (WEQ) and a variety of criterion measures of satisfaction and motivation. Analysis of the responses showed that the organizational variables fell into nine broad categories, of which two--quality of life and supervision--were significantly related to measures of satisfaction and motivation. The supervision factor primarily applied to job-related factors such as effort, while the quality of life factor concerned non-job-related factors such as intention to reenlist. (Author)

N80-28253/6 PC **A03**/MF **A01**
North Carolina Science and Technology Research Center, Research Triangle Park.
A Regional Technology Transfer Program.
Final Report, 1 Jan. - Dec. 1979.
31 Dec 79, 37p NASA-CR-163360
Contract NASW-3055

The proliferation of online searching capabilities among its industrial clients, changes in marketing staff and direction, use of Dun and Bradstreet marketing service files, growth of the Annual Service Package program, and services delivered to clients at the NASA funded North Carolina Science and Technology Research Center are described. The library search service was reactivated and enlarged, and a survey was conducted on the NC/STRC Technical Bulletin's effectiveness. Several quotations from clients assess the overall value of the Center's services.

PB80-199086 PC **E03**/MF **A01**
Department of Commerce, Washington, DC. Office of Product Standards.
Principal Aspects of U.S. Laboratory Accreditation Systems.
Jul 80, 161p
Supersedes PB-293 463.

The report presents two-page summaries of laboratory accreditation systems in three areas: Federal government, state and local government, and professional and trade associations. A total of 70 systems are included in the summaries. Information covered includes date established, type and scope of the systems, authority for the systems, funding and fees, fields of testing, standards and accreditation criteria employed, frequency and extent of laboratory assessment, appeal procedures, extent of proficiency testing required, the number of laboratories in the system, and the extent of international recognition. For each system a person has been identified who can process an application or is in other ways knowledgeable about the nature and content of the system.

PB80-200421 PC **A07**/MF **A01**
Kensington Inst., Washington, DC.
Assessment of the Trade Adjustment Assistance Centers (First Year).
31 May 80, 144p EDA-80-098
Grant EDA-99-26-09991
Prepared in cooperation with Associated Research Analysis Corp., Washington, DC.

This report provides the findings and conclusions of the first year assessment of the implementation of the Trade Adjustment Assistance Program. These findings are based on a site visit to each of the ten TAAC projects. This assessment is limited to a process analysis which focuses on the operational characteristics of the TAAC projects. The TAAC program matured greatly during the first year and that by September 30, 1979, the end point of this assessment, the program was fully operational and operating effectively.

PB80-202575 PC **A08**/MF **A01**
Performance Development Inst., Washington, DC.
Interim Report on Potential ICC/ETIP (Interstate Commerce Commission/Experimental Technology Incentives Program) Administrative Experiments.
Michael Mulkey, Warren Frederick, and Dan Fulmer. Mar 80, 170p NBS-GCR-ETIP-80-85
Contract NBS-7-35822

The document describes work performed toward evaluating the commercial effects and implications for innovation of the recent decision of the Interstate Commerce Commission (ICC) to exempt railroad transportation of fresh fruits and vegetables from regulation. The first chapter provides an introduction and summary. Chapter II describes the historical background of ETIP's work in the area of regulation and freight transportation innovation, and the genesis of ICC's regulatory exemption for rail transportation of fresh produce. Chapter III discusses expectations, concerns and issues related to this exemption, and the environment for change in fresh produce rail transportation operations. Chapter IV addresses possible effects of the exemption on the ICC and in the commercial sector. Chapter V discusses other areas of transportation regulatory change which may be appropriate for study by ETIP.

PB80-203102 PC **A12**/MF **A01**
National Science Foundation, Washington, DC. Directorate for Scientific, Technological, and International Affairs.
Report of the Working Group on Private Sector/Government Relationships for Scientific and Technical Information.
Final rept.,
Howard Resnikoff, Melvin Day, Richard Farley, Harold Schoolman, and Carole Ganz. Jun 80, 272p NSF/INT-80/01

The Ad Hoc Committee on Scientific and Technical Information (STI) Policy of the Federal Coordinating Committee on Science, Engineering, and Technology (FCCSET) was established in 1979 to assess the Government-wide management of STI. As part of its work, this Committee created a Working Group on Private Sector/Government Relationships for STI. This report of the Working Group consists of two parts. The first part summarizes the results of contractor studies completed for the Working Group. The studies provide recent data on Federal STI centers, characterize the interactions between Federal and non-Federal STI suppliers, and review contemporary economic theory with relevance to Federal/non-Federal participation in the dissemination of STI. These contractor reports are appendices A, B, and C. The second part of the report is an attempt by the Working Group, using the information gathered by the contractors, as well as their own experience and knowledge, to respond to the Ad Hoc Committee's assignment.

PB80-204654 PC **A25**/MF **A01**
National Bureau of Standards, Washington, DC. Experimental Technology Incentives Program.
Procurement of Evaluation Systems: A Case Study of the Parametric Factor Evaluation Approach to Source Selection.
Final rept.,
Ardwin S. Libman. Jul 80, 592p NBSIR-80-2092

The document is a case study of the use of a system contractor source selection process by a federal program. Its primary research value is as a bench mark for future case studies on source selection techniques in general and for future re-

search on the specific source selection process reported on here. Its primary administrative value is to those responsible for procuring systems (and other complex and uncertain products, e.g., large evaluations) as an evaluation of the outcome of the use of the specific technique in terms of the issues critical to effective source selection. The specific problem for which the technique was used was the selection of two contractors to develop an ongoing capability to evaluate the results (agency and commercial impacts) of experimental modifications in procurement procedures by selected federal, state, and local government agencies. These evaluation systems were to be implemented by organizations outside of the developing organization.

PB80-206170 PC **A06**/MF **A01**
Idaho Transportation Dept., Boise.
Equipment Management System Development and Implementation.
Final rept. Mar 79-Apr 80,
Roy W. Jump, Steven C. Hutchinson, and Elizabeth C. Johnson. May 80, 102p
Contract DOT-FH-11-8596

The report contains a summary of procedures taken to implement an Equipment Management System using manual derived from a pooled fund study written in June 1978. The purpose is to ascertain if the manual provides sufficient information to serve as a basis for an Equipment Management System. The report explains what portions of the manual were used in the system and delineates areas of divergence.

PB80-207533 PC **A06**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Highway Safety Research and Development--Better Management Can Make It More Useful.
28 Jul 80, 113p CED-80-87A

GAO has issued concurrently with this supplement a report with the above title. The Department of Transportation commented on the draft of that report, and this supplement contains GAO's evaluation of and response to those comments.

UCID-18037-79-1 PC **A03**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA. San Diego Technology Action Center.
Federal Laboratory Consortium for Technology Transfer. Far West Region Local Government Assistance Task Force. First Progress Report.
C. F. Miller, and A. A. Sjoholm. Dec 78, 43p
Contract W-7405-ENG-48

The Far West Region Local Government Assistance Task Force is a current demonstration project of the Federal Laboratory Consortium. It is directed toward the analysis of the needs and problems experienced by public administrators as a result of the budget cuts necessitated by Proposition 13, and the intensification of Federal Laboratory assistance in arriving at appropriate solutions. Progress Report No. 1 describes the background purposes, organization, and activities of the Task Force as well as plans for the coming year. Major projects have begun with the City and County of San Diego, and aggreements have been reached with the city of Berkeley on the approach to be used with the city. Through the Task Force effort new applications and adaptations of current technologies are expected which can be transferred to other cities. New methods of accessing the information and material available will be developed and documented. Periodic progress reports, presentations, and journal articles are planned to disseminate the Task Force findings. (ERA citation 04:033713)

5B. Documentation and Information Technology

AD-A086 300/1 PC **A17**/MF **A01**
Defense Technical Information Center Alexandria VA
Proceedings of Military Librarians Workshop (23rd) Held at Alexandria, Virginia, 3-5 October 1979. Military Special Libraries in 1990.
Conference proceedings,
Olga G. Luchaka, Barbara P. Gladd, Gail B. Martens, and Loretta M. Brown. Jun 80, 393p
Rept no. DTIC/TR-80/4
See also Proceedings no. 22, AD-A066 778.

The theme of the 23rd Annual Military Librarians Workshop--held in Alexandria, VA and sponsored by the Defense Technical Information Center (Formerly Defense Documentation Center)--was Military Special Libraries in 1990. More than 150 military librarians participated in six individual task groups, consisting of a number of general sessions, highlighted by well-known speakers in the information industry. The respective discussion topics assigned to these groups were Contracting Out Library Services, Closing the Card Catalog, New Products and Services, Managing Libraries, Steady-State (No Growth) Libraries, and Basic Planning for Library Automation. The workshop general sessions, consisting of lecture presentations followed by questions and informal discussions, were interspersed in the program with task group meetings. Each task group had a full schedule of speakers on its specific topic to assist group members to define and propose solutions to future problems likely to confront military special librarians in the 1990's. Emphasis was placed on the impact of new technology on the changing role of the Library, its relationship to future user needs, and library management in the probable work situation in the 1990s. The ability of librarians and, more importantly, of users to cope with the changes foreseen was a major interest. The workshop concluded with task group summaries presented by the group leaders. (Author)

AD-A086 520/4 MF **A01**
Naval Postgraduate School Monterey CA
The Naval Postgraduate School Secure Archival Storage System. Part I - Design.
Technical rept.,
Roger R. Schell, and Lyle A. Cox, Jr. Mar 80, 327p Rept no. NPS52-80-002
Availability: Microfiche copies only.

There is an increasing need for systems which provide controlled access to multiple levels of sensitive data and information. This report comprises the first phase of the realization of such a system: the comprehensive design of a multilevel secure file storage system. This is the focus of an ongoing research project, which is currently in the early implementation phases. The design is based upon security kernel technology as applied to modern multiple microcomputer arrays. This design is intended to interface with other (distributed) processing elements, perhaps forming the central hub of a data secure network of computers. The design would provide archival shared storage while insuring that each interfacing processor accessed only that information appropriate. The design phase of the project is presented in a series of three research reports (Masters Degree theses). These reports, reprinted in their entirety here are: (1) O'Connell and Richardson's definition of a secure multi-microprocessor family of operating systems; (2) Coleman's detailed security kernel design for a member of this family; and (3) Parks' hierarchical file system designed to run under the control of Coleman's security kernel. (Author)

AD-A086 576/6 MF **A01**
Frank J Seiler Research Lab United States Air Force Academy CO
A Research Activities Management System.
Final rept. 1 Nov 79-27 Feb 80,
John S. Wilkes. Feb 80, 43p Rept no. FJSRL-TR-80-0007
Availability: Microfiche copies only.

A Research Activities Management System is described. It is a computerized storage and retrieval system that allows the manager of a scientific or engineering research organization to receive an organized accounting of the research activities of the organization. The scope of the data base and the nature of the items comprising the data base are defined. Examples of the use of the system are presented, using the research activities of a chemistry basic research laboratory as the data base. (Author)

AD-A086 592/3 PC **A04**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
An Annotated Selective Bibliography on Human Performance in Fault Diagnosis Tasks.
Final rept. Mar 78-Jul 79,
William B. Johnson, Sandra H. Rouse, and William B. Rouse. Jan 80, 57p ARI-TR-435
Grant DAHC19-78-G-0011

This is an annotated bibliography of 61 published works about human performance in fault diagnosis. The sources are predominately from the disciplines of engineering, psychology, and education. Computer searches were conducted of the past 10 years of Psychological Abstracts and ERIC Documents. Manual searches using references from reports, University of Illinois library card catalog and solicitation of reference from experts in the extended the search to include references dating from the early fifties. (Author)

AD-A086 806/7 PC **A04**/MF **A01**
Office of Naval Research London (England)
European Scientific Notes. Volume 34, Number 6,
Richard S. Hughes, and Don J. Peters. 30 Jun 80, 54p Rept no. ESN-34-6

This is a monthly publication presenting brief articles concerning recent developments in European Scientific research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by calling attention to current developments and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL and occasionally articles are prepared by, or in cooperation with, members of the scientific staffs of the United States Air Force's European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

AD-A086 811/7 PC **A05**/MF **A01**
Naval Research Lab Washington DC
Functional Design for an Automated Data Base Error Detection System.
Final rept.,
Gerald A. Wilson, Sandra B. Salazar, and Kathryn L. Heninger. 15 May 80, 87p NRL-MR-4223, AD-E000 448

This report documents the design proposed for an automated system for data base error detection. The system, called COPE, will be a front end to the data base management system to catch errors before they enter the data base. It will check for errors in each user's updates and prevent errors due to undesirable interactions between users. It should be invisible to the users during normal processing; when an error is detected, it will operate interactively to inform the user and to request correction.

AD-A086 838/0 PC **A05**/MF **A01**
Stanford Univ CA Dept of Computer Science
Databases in Healthcare.
Technical rept.,
Gio Wiederhold. Mar 80, 79p Rept no. STAN-CS-80-790
Grant N00039-80-G-0132

This report defines database design and implementation technology as applicable to healthcare. The relationship of technology to various healthcare settings is explored, and the effectiveness on healthcare costs, quality and access is evaluated. A summary of relevant development directions is included. Detailed examples of 5 typical applications (public health, clinical trials, clinical research, ambulatory care, and hospitals) are appended. There is an extended bibliography. (Author)

AD-A086 881/0 PC **A07**/MF **A01**
Army Missile Command Redstone Arsenal AL Systems Simulation and Development Directorate
A Relational-Based Data Management System for Engineering and Scientific Application.
Technical rept.,
Maurice M. Hallum, III. Jun 80, 140p Rept no. DRSMI/RD-80-11

The description and development of a user friendly Data Management System based on the relational data model is presented. The system is a self-contained Data Management System programmed in FORTRAN for the Interdata 8/32. A file system, inquiry language, and a demonstration of the operational system is also presented. The system is intended for use in a scientific and engineering environment designed for the casual user. Background data and a general discussion of data models are also included. (Author)

CERN-79-03 PC **A02**/MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
Lev D. Landau: His Life and Work.
F. Janouch. 28 Mar 79, 23p
U.S. Sales Only.

A biographical portrait of the Soviet theoretical physicist was presented at a CERN Colloquium in June 1978. A selected list of 39 scientific papers, and 18 references to his work in books and articles, are appended. (Atomindex citation 11:503212)

ED-176 757 Not available NTIS
Developing Countries and Its Information Needs and Supply: A Brief Report of an International Seminar,
T. K. S. Iyengar. Sep 77, 7p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-Setptember 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Brief summaries of the 30 papers presented to the UN/ICSU/COSTED International Seminar on 'Technical Information Services for Developing Countries', held in March 1977 at the Indian Institute of Technology, Madras, are provided in this overview of the session. The report concludes with four recommendations made by seminar participants: (1) the establishment of a technical information service which would create databases in special problem areas of local importance, publish and distribute basic science information, and organize mass media material for immediate use; (2) the organization of regional training courses to train information personnel; (3) the development of infrastructure for a science and technology information network; and (4) initiation of software development and manufacture in developing countries.

ED-176 764 Not available NTIS
Resource Sharing in West Africa: Some Implications for the Development of National Information Policies,
G. M. Sheriff. Sep 77, 14p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, Va. 22210.

This paper briefly examines the current state of library cooperation in the West African countries, in relation to the implementation of national information policies in these countries. Library cooperation within the framework of a national information policy in developing countries is considered as a primary need rather than the development of highly expensive computerized systems, which do not fit in the present economic situation in these countries where resource sharing is an essential need due to the lack of basic resources. The Standing Conference of University Libraries (Western Area) (SCAULWA) has examined the problems of library cooperation among Francophone and Anglophone West African countries and concluded that it would be more economical and more efficient to continue to use the services provided by the Bibliotheque Nationale and the British Lending Library. However, a plan has been set up to produce a Union List of Serials in West African university libraries.

ED-176 765 Not available NTIS
Resource Sharing of Libraries in Developing Countries: The Case for Library Networking,
I. M. N. Kigongo-Bukenya. Sep 77, 22p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Library networking is defined, and several topics are examined as they relate to developing nations--the need for library networking, the necessity of a survey of existing services, the network structure, the legal framework, financing, the need for manpower, and technological needs. Library networking is defined as the process of carefully planning and setting up a connected national system of libraries, documentation and archives services, and the predetermination of the implementation process to achieve the set goals of the system.

ED-178 028 Not available NTIS
The Arrangement of Entries in Non-Roman Scripts in Multiscript Catalogs and Bibliographies,
Hans H. Wellisch. 1978, 24p
Pub. in International Forum on Information and Documentation, v3 n3 p18-24 1978. Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Citing the confusion generated for both librarians and users that results from the Romanization of bibliographic entries written in non-Roman scripts, it is argued that a standardized solution generally applicable to the arrangement of non-Roman script entries in bibliographic control tools should be found and adopted. Such entries should not be filed mechanically by name or script only because the resulting order would put entries for small collections in little-used scripts before those of more extensive collections in widely-used scripts, and would disperse entries in closely related scripts. A filing order for the 13 scripts that produce the present world output of books is proposed, based on the criteria of family affinity of scripts and the script's rank in the volume of world book production. Interfiling of entries in different languages or further subdivision by language, depending on the character of the script, is also suggested. A list of references is provided in addition to tables illustrating several aspects of the proposed solution.

ED-178 035 Not available NTIS
National Library of Australia, Canberra.
Library Services for the Handicapped. Development of Resource Sharing Networks, Networks Study No. 9. A National Consultative Seminar, Canberra, August 1-3, 1978.
Aug 78, 165p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Sales and Subscriptions Unit, National Library of Australia, Canberra, ACT 2600, Australia ($5.75).

Speeches, papers, and summaries of group discussions from Australia's 1978 national seminar on library services for the visually and physically impaired are presented. The opening and keynote addresses are followed by two papers dealing with the present state of services in Australia and other nations, two papers on the library service needs of the blind and physically handicapped, and two papers concerned with meeting those needs in the future. The eight group discussion reports relate to (1) the question of segregation or integration of library services to the handicapped, (2) the role of voluntary organizations in providing such services, (3) promotion of services, (4) training of library service staff members who serve the handicapped, (5) rationalization of resources, (6) role of library services to the handicapped, (7) design of facilities to accommodate the handicapped, and (8) delivery of library services to the handicapped. Appendices provide a list of seminar participants; guidelines for the group discussions; a survey of institutions of higher education offering courses in librarianship; copyright implications of library services for the handicapped; a section detailing the principles, requirements, and structure of library services to the blind; and a reading list on library services to the handicapped.

ED-178 036 Not available NTIS
Florida State Library, Tallahassee.
Manual for Florida Public Library Boards,
Katherine B. Davis. Aug 75, 65p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Intended as both a resource tool for assisting Florida public library boards in their functions and a training tool for new and inexperienced board members, this manual provides a means for compiling all information pertinent to board operations into one sourcebook and for keeping this material up-to-date. It is organized into eight chapters: (1) the library and its board, including the public library in Florida law and board responsiblities and powers; (2) organization--selection and appointment of board member's bylaws, meetings, continuing education for board members; (3) library director, including his selection and board/director relationship; (4) planning; (5) policies; (6) budget, including funding sources; (7) public relations--organizing friends groups, lobbying, writing to Congressmen; and (8) the Florida State Library, which presents an organizational chart.

ED-178 039 Not available NTIS
Organizing a Nursing Home Library for Residents. A Do-It-Yourself Manual,
Ruth V. Curtis. 1978, 16p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Those guidelines for developing and maintaining a library in a resident nursing home, for use by either staff members or volunteers, recommend an individual survey of each resident as a way of determining reading preferences and deciding what materials should be ordered. Other areas examined are the location of the library, including space and furniture needs; acquisition of books, magazines, newspapers, audiovisual materials, and library supplies; organization of materials, including formats for book cards and pockets, and for shelf list, author, title, and subject catalog cards; circulation procedures; and publicity for library events. Pertinent information resources in the Central New York area are listed.

ED-178 045 Not available NTIS
Kansas Univ., Lawrence. Univ. Libraries.
Collection Development Policy for the University of Kansas Libraries,
Ted Sheldon. 1 Mar 78, 320p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This policy reflects developmental patterns governing the evolution of collections in the University of Kansas Libraries. Policy statements, written by bibliographers, are provided for 54 subject areas. Each policy statement includes a statement of purpose; collection guidelines (languages, chronological guidelines, geographical guidelines treatment of subject, type of material, date of publication, other resources, related subject policy statements); levels of collecting intensity by subject subdivision; and strengths and weaknesses evaluated in terms of programs and clientele served.

ED-178 051 Not available NTIS
Marquette Univ., Milwaukee, WI.
Directory of Simulations, Experiential Materials, Courses and Members,
James W. Schreier. 1977, 94p
Sponsored by the Association for Business Simulation and Experiential Learning, Dallas, TX.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Five major sections in this directory present information from the Association for Business Simulation and Experiential Learning (ABSEL), including (1) simulations/experiential materials, (2) course descriptions, (3) ABSEL interest directory, (4)

ABSEL membership directory, and (5) ABSEL facts and figures. Section 1 contains short summaries of simulations and experiential materials submitted by ABSEL members, together with and information on availability, student materials, teaching notes, special materials, time guidelines, and class size limitations. Section 2 provides summaries of courses, and descriptions of materials and evaluation techniques used in teaching by ABSEL members. Section 3 lists ABSEL members who responded to an interest survey according to functional research, and information-seeking interest categories. A complete listing of all current ABSEL members, and a variety of informative facts about ABSEL and its members are provided in sections 4 and 5.

ED-178 061 Not available NTIS
Baylor Univ., Waco, TX.
Management of Audio-Visual Media Services. Part II. Practical Management Methods,
Robert V. Price. Feb 78, 15p
Pub in CCRC Report, v2 n4 Feb 1978. Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper furnishes a framework that allows the local audiovisual administrator to develop a management system necessary for the instructional support of teaching through modern media and educational technology. The structure of this framework rests on organizational patterns which are explained in four categories: complete decentralization, centralization of library materials and services only, centralization of separate library and audiovisual services, and centralization of school media center services. Information is provided on the selection of media software and costs for commercially produced audiovisual media, as well as 1978 cost estimates for such audiovisual hardware as projectors, recorders, video cameras, and monitors. Inventory control procedures, the purchase and maintenance of audiovisual equipment, and the identification of media services external to the school are also covered.

ED-178 084 Not available NTIS
State Univ. of New York, Buffalo. School of Information and Library Studies.
Phonorecords: Storage and Care Self-Evaluation Form,
John W. Ellison. 1978, 21p
Sponsored in part by Office of Education, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This self evaluation form designed to aid librarians in the care and storage of phonograph records, was developed from an extensive literature search on the subject of storage and care of non-book materials. A checklist of items relevant to proper care and storage procedures includes such information as temperature, humidity, types of packaging, containers, shelving, and record cleaning. A bibliography on phonograph record care and a general bibliography on audiovisual usage, nonprint media storage, and preservation are included.

ED-178 091 Not available NTIS
State Univ. of New York, Buffalo. School of Information and Library Studies.
Films, Filmstrips, Filmloops, Transparencies and Slides: Storage and Care Self-Evaluation Form,
John W. Ellison. 1978, 21p
Sponsored in part by Office of Education, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This self-evaluation form or chekclist is designed to assist librarians who work with active non-book collections of films, filmstrips, filmloops, transparencies, and slides in evaluating the quality of their storage and care practices. A rationale for having a storage and care program, and recommendations for storing and taking care of non-book material in an active collection are given. A bibliography on the care and storage of non-book materials is included, as well as miscellaneous, more general sources.

HRP-0030843/7 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
Health Data Banks.
1977, 37p ICP/DHS-002
Report on a Joint IFIP/WHO Working Group, Held at Prague (Czechslovakia) on August 23-27, 1976.

The World Health Organization's Regional Office for Europe convened a multidisciplinary group of clinicians, epidemiologists, public health physicians, computer scientists, statisticians, and health administrators to discuss the planning and development of health data banks and linkages between information from various health programs. Broad statistical uses of health data banks were identified, including simplifying complex problems by providing objective data to aid in decisionmaking, predicting probable consequences of different actions and ascertaining the effectiveness of intervention, discovering ways of improving performance in health skills and services, comparing results in different groups or against specific objectives, and assessing the resources needed to maximize benefits at minimum costs. Attention was given to privacy and confidentiality, communication with data users, the organization and techniques of input into data banks, data bank concepts and hardware considerations, training, the exchange of information, and terminology. The following types of health data banks were examined: hospital administrative data banks, community-oriented data banks in health care, data banks on absence due to ill health, administrative data banks on ambulatory patients, data banks in general practice, child health status data banks in the United Kingdom, disease registers, and health manpower data banks.

HRP-0901899/5 PC **A06**/MF **A01**
Association of Univ. Programs in Health Administration, Washington, DC.
Educational Program for EMS (Emergency Medical Services) Systems Administration and Planning. Module U - Computers and Information Systems,
Myrna Howells, and Barry A. Cooper. 1977, 105p
Contract PHS-HRA-231-75-0602
See also Instructor's Manual, HRP-0901877, and Sponsor's Guide, HRP-0901878.

An instructional module on computers and information systems is presented as part of an educational program for emergency medical services (EMS) systems administration and planning. The program consists of 23 such modules, which can be adapted to a variety of educational needs and settings. The module focuses upon concepts of information processing, computer systems, and information systems and their application to EMS. The 8-hour instructional format consists of three seminars. Readings, assignments, and instructional materials are noted, and guidelines for conducting the seminars are given. The three seminars focus on the topics of information processing concepts and the EMS information system, computer hardware and software in EMS, and the EMS administrator's role in management information systems. Appended are detailed course content outlines, a discussion of EMS application, and a handbook on patient recordkeeping, systems for EMS, and minimum data requirements. A variety of sample information and recordkeeping forms are presented.

NP-24166 PC **A04**/MF **A01**
Mineraloelwirtschaftsverband e.V., Hamburg (Germany, F.R.).
Language of Oil. 5TH Revised Edition.
Sep 78, 56p
In German.
U.S. Sales Only.

In alphabetic order, terms and expressions are listed which come from the field of crude oil and mineral oil products, their availaility, marketing, taxing, tariffing, etc., with definitions or explanations. (ERA citation 05:005346)

NUREG-0304-V-4 PC **A16**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Regulatory and Technical Reports, Compilation for 1979. Volume 4.
Bibliographical rept. Jan-Dec 79,
Walter E. Oliu, Linda McKenzie, and Ray Aragon.
Jul 80, 353p
See also Volume 3, Number 1, NUREG-0304-V-3-1.

The compilation lists formal regulatory and technical reports issued in 1979 by the U.S. Nuclear Regulatory Commission (NRC) staff and by NRC contractors. The compilation is divided into three major sections. The first major section consists of a sequential listing of all NRC reports in report-number order. The first portion of this sequential section lists staff reports, the second portion lists NRC-sponsored conference proceedings, and the third lists contractor reports. Each report citation in the sequential section contains full bibliographic information.

NUREG-0540-V-2-4 PC **A23**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Title List of Documents Made Publicly Available, April 1-30, 1980. Volume 2, Number 4.
Monthly rept.
Jul 80, 533p
See also Volume 2, Number 3, NUREG-0540-V-2-3.

The document is a monthly publication containing descriptions of information received and generated by the US NRC. This information includes (1) docketed material associated with civilian nuclear power plants and other uses of radioactive materials and (2) nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. The docketed information includes information formerly issued through the U.S. Department of Energy's Technical Information Center under the title Power Reactor Docket Information (PRDI). This document replaces PRDI, which will no longer be prepared. This document contains the following indexes: Personal Author Index, Corporate Source Index, and Report Number Index.

PB80-200447 PC **A13**/MF **A01**
Acurex Corp., Mountain View, CA. Energy and Environmental Div.
Environmental Assessment Data Systems User Guide: Liquid Effluents Data System.
Final rept. Sep 78-Sep 79,
R. J. Larkin. Jan 80, 284p EPA-600/8-80-008
Contract EPA-68-02-2699

The report is a user guide to the Liquid Effluents Data System (LEDS), a computerized data base on liquid effluents (or wastewater) from stationary point sources. The LEDS is one of four waste stream data bases which are components of the Environmental Assessment Data Systems (EADS). The EADS concept has been designed to aid researchers in environmental assessment, emissions characterization, and control technology development. LEDS contains data from source sampling which may include: conventional wastewater pollutant concentrations; design and typical operating data on control technology applied to the liquid effluent stream; analysis of any fuel or feedstock to the process producing the effluent stream; results of chemical, physical, radiological, and biological/ecological tests of liquid samples; process descriptions of the sources; and descriptions of the sampling equipment and techniques employed. The LEDS protocol is consistent with Level 1 and 2 reporting requirements. The guide gives detailed instructions for encoding LEDS data sets, defines procedures for submitting and retrieving data, and contains standard nomenclature to facilitate data encoding. It also contains a program library that describes analytical software available to the user and provides instructions for its use. It also discusses ways for the user to access LEDS.

PB80-200678 Not available NTIS
National Bureau of Standards, Washington, DC.
Integration of an Information System: Chaos or Control: How to Select.
Final rept.,
P. Berger. 1980, 40p
Pub. in Proc. of National Information Conference and Exposition (4th), Washington, DC., 40p, 29 May 80.

With the bewildering array of options available to information managers, selection of an information

system is critical. Failing to appreciate the impact automated information services will have on the library and information center may indeed cause chaos.

PB80-200876 PC **A13**/MF **A01**
Acurex Corp., Mountain View, CA.
Environmental Assessment Data Systems, User Guide, Gaseous Emissions Data System.
Rept. for Sep 78-Sep 79,
R. J. Larkin. Jan 80, 280p EPA/600/8-80-006
Contract EPA-68-02-2699

The report is a user guide to the Gaseous Emissions Data System (GEDS), a computerized data base on gaseous emissions from stationary point sources. GEDS is one of four waste stream data bases which are components of the Environmental Assessment Data Systems (EADS). The EADS concept has been designed to aid researchers in environmental assessment, emissions characterization, and control technology development. GEDS contains data from source sampling which may include: design and typical operating data on control technology applied to the gaseous effluent stream; analysis of any fuel or feedstock to the process producing the effluent stream; results of chemical, physical, radiological, and biological/ecological tests of gaseous samples; process descriptions of the sources; and descriptions of the sampling equipment and techniques employed. The GEDS protocol is consistent with Level 1 and 2 reporting requirements. The guide gives detailed instructions for encoding GEDS data sets, defines procedures for submitting and retrieving data, and contains standard nomenclature to facilitate data encoding. The guide also includes a program library that describes analytical software available to the user and provides instructions for its use. The guide also discusses procedures which will allow its users to access GEDS directly by computer or through the EPA project officer.

PB80-201866 PC **A06**/MF **A01**
National Science Foundation, Washington, DC. Engineering and Applied Science.
Recent Research Reports: Entries 949-1045.
Bibliography rept.
Apr 80, 101p NSF/RA-800031
Grant NSF-ISP75-22472

This report contains 96 abstracts of recent technical reports, journal articles, and other documents resulting from research programs supported by the Directorate for Engineering and Applied Science (EAS) of the National Science Foundation. The primary purpose of this directory is to apprise the scientific and technical community of current research in the following areas: public policy and regulation; public service delivery and urban problems; physical, mathematical, and engineering applications; geophysical and environmental applications; earthquake hazards mitigation; state government; energy systems; fire research; weather modification; non-renewable resources--fossil energy; exploratory research and technology assessment; renewable resources--crops and solar energy; and symposium proceedings. Each citation includes an entry number, title, performing organization, author, publication date, EAS number, award number, pagination, availability information, and an abstract. A description of the major EAS program elements and objectives is provided.

PB80-202658 CP **T99**
National Library of Medicine, Bethesda, MD.
ILS (Integrated Library System).
Software,
Charles M. Goldstein, and Richard S. Dick. 28 Jun 80, mag tape NLM/DF-80/001
Source tape is in ASCII character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products for price. Price includes documentation, PB80-202666, and PB80-202674.

The ILS represents a developmental effort of the Lister Hill National Center for Biomedical Communications of the National Library of Medicine, designed to achieve a level of functional integration, small system implementation potential, and user features not presently available in library systems. The specific ILS design objectives have been (1) to achieve a modular integration of functional capabilities, (2) to allow for small system implementation, (3) to maximize transportability, (4) to have sizing dependent only on hardware, (5) to provide for system network access, and (6) to support multi-level user interfaces. The present release Version 1.0, contains the ILS kernal and the following functional modules: Circulation Control, Serials Check-In, Master Bibliographic File (MBF), Creation and OCLC Tape Loading. ILS is implemental under the MIIS/MUMPS operating systems...Software Description: The program is written in MIIS programming language for implementation on a Data General Eclipse C-330 computer using the Meditech MIIS 4.2 operating system. 265 K bytes of core storage are required to operate the system.

PB80-202666 PC **A03**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
A Guide to Using the Bibliographic Features of the Integrated Library System (ILS),
Susan G. King. Mar 80, 34p MTR-80W0074, NLM/DF-80/001A, LHNCBC-80-01
Contract N01-LM-8-4720
For system on magnetic tape, see PB80-202658. See also PB80-202674.

This manual is a guide to using the bibliographic features of the Integrated Library System (ILS), a library minicomputer system in which all automated library functions are processed against a single database. The document is oriented toward ILS users with no ADP training or experience; no attempt is made to provide documentation at the programmer level. Since this guide covers both those ILS features which are currently available and those which are now being designed or implemented, the level of detail provided varies. In general, the ILS functions which are not currently available are discussed only in general terms and are characterized as 'not yet operational'. The available functions are covered in sufficient detail to enable the reader to use them without referring to other documents.

PB80-202674 PC **A04**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
A Users Guide to Maintaining the Master Bibliographic File of the Integrated Library System (ILS),
Sandy E. Anderson. Apr 80, 63p MTR-80W00126, NLM/DF-80/001B, LHNCBC-80-02
Contract N01-LM-8-7420
For system on magnetic tape, see PB80-202658. See also PB80-202666.

The Integrated Library System (ILS) is a minicomputer-based system in which all automated library functions are processed against a single database. This manual details the protocols by which users of the ILS may create, edit and print tag and indicator fields within the Master Bibliographic File of the database. The Master Bibliographic File comprises the data structure of the cataloging copy for all records contained in the ILS. It serves as the template against which all records are created and stored in machine readable form.

PB80-202948 PC **A99**/MF **A01**
National Bureau of Standards, Washington, DC. Technical Information and Publications Div.
Publications of the National Bureau of Standards, 1979 Catalog; a Compilation of Abstracts and Key Word and Author Indexes.
Rept. for Jan-Dec 79,
Betty L. Burris, and Rebecca J. Morehouse. Feb 80, 622p NBS-SP-305-SUPPL-11
See also 1978 catalog, PB-297 424. Library of Congress catalog card no. 48-47112.

The 11th supplement to Special Publication 305 of the National Bureau of Standards lists the publications of the Bureau issued between January 1-December 31, 1979. It includes an abstract of each publication (plus some earlier papers omitted from Special Publication 305 Supplement 10), key-word and author indexes; and general information and instructions about NBS publications.

PB80-203714 PC **A03**/MF **A01**
Fish and Wildlife Service, Kearneysville, WV. Eastern Energy and Land Use Team.
Development and Evaluation of Information Transfer Procedures for Fish and Wildlife Service Field Offices and Biological Services Team.
Final rept. Aug 76-May 78,
Robert L. Little, and Joe W. Hardy. Feb 79, 36p FWS/OBS-79/02

In mid-1976, the Biological Services Program (BSP) of the U.S. Fish and Wildlife Service initiated information transfer pilot projects for the purpose of defining the roles and responsibilities of the BSP components (National Teams and Groups, Office of Biological Services headquarters, Washington, DC, and Regional Activity leaders) and hindrances to effecting the Program's responsibility of 'bridging the gap between research and operations.' The results and experiences of the National Stream Alteration Team with the Vicksburg (Mississippi) Ecological Services Field Office are detailed in this report.

PB80-204019 PC **A02**/MF **A01**
National Telecommunications and Information Administration, Washington, DC.
The Foundations of United States Information Policy,
Arthur A. Bushkin, and Jane H. Yurow. Jun 80, 20p NTIA-SP-80-8
A United States Government Submission to the High-Level Conference on Information, Computer, and Communications Policy Organization for Economic Cooperation and Development held in Paris, France on October 6-8, 1980.

A nation's international information policies do not exist in a vacuum, but rather are an extension of its domestic information policy perspectives. Thus, before any nation can adequately represent the interests of its own society in international forums, it must be cognizant of the objectives of its domestic information policies and it must evaluate their continuing validity and responsiveness to current development. This paper describes the focus of these deliberations in the United States. Certain fundamental policy assumptions emerge as the foundation of United States policies, although there is a need to strike balances in the significant tensions among these assumptions. This paper presents these assumptions as they manifest themselves in the information policies of the United States, and highlights the tradeoffs which they imply. The policies presented herein form the principles upon which the United States generally approaches international information policy issues.

PB80-204548 PC **A10**/MF **A01**
Illinois Univ. at Urbana-Champaign. Graduate School of Library Science.
The Impact of a Paperless Society on the Research Library of the Future.
Final rept.,
F. W. Lancaster, Laura Drasgow, and Ellen Marks. Feb 80, 221p
Grant NSF-DSI78-04768

The research undertaken relates to possible future developments in the publishing industry and the likely impact of these developments on research libraries. A Delphi study, conducted with representative samples of publishers, librarians and technologists, confirmed the probable conversion from print on paper publishing to electronic publishing in the case of indexing/abstracting services, scholarly journals, reference books, patents, technical reports, standards and specifications, and dissertations. A substantial move into this conversion will have occurred by the year 2000. A literature search was undertaken to uncover previous forecasts on the future of libraries, these forecasts being reviewed in the final report. Technological developments likely to affect publishing and other information transfer activities in the future are reviewed and the characteristics of a completely paperless communication system are outlined. A scenario depicting the functions of the research library in the year 2001 is presented and discussed. The scenario predicts the decline of the library as an institution but an increase in the importance of the information professional.

PB80-205248 PC **A08**/MF **A01**
CADCOM, Inc., Annapolis, MD.
Technical Report Abstracts - Maritime Administration Research and Development, 1973-1979.
1980, 161p MA-RD-900-80084

The publication presents detailed description and ordering information on technical reports prepared

for the Maritime Administration for the years 1973-1979.

PB80-927908 PC **E07**/MF **A01**
Central Intelligence Agency, Washington, DC.
Directory of Officials of the Czechoslovak Socialist Republic; a Reference Aid.
Jul 80, 175p CR-80-11926
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-927900.

The directory is a functional reference guide to officials of the Czechoslovak Government, the Czechoslovak Communist Party, and other prominent public organizations.

QEI-Report-8915 PC **A06**/MF **A01**
QEI, Inc., Bedford, MA.
Review of Options Regarding the Future Operation of the DOE/RECON System and the Marketing of Information Products of the DOE Technical Information System.
J. W. Kuipers, F. W. Lancaster, and R. W. Thorpe. 15 Sep 78, 116p
Contract EU-78-C-01-6182

Problems of the DOE/RECON system and DOE/TI information marketing are addressed, and the role of DOE/TI activities in the overall DOE information transfer process is discussed. Factors to be considered in a pricing policy for DOE/TI information products are examined. It is recommended that the costs to produce basic technical reports and secondary information products be assumed by DOE, but that costs of value-added services be assumed partially or completely by product users. It is also recommended that, for a trial period of not more than two years, the DOE/RECON system be operated as at present and that provision be made for the on-line distribution of the EDB and GAP files as public files on commercial vendor systems; costs of public files would be borne by the users. If commercial vendors elect not to distribute the EDB and GAP files, then they should be mounted as private files on a selected commercial system with costs shared by DOE and system users. 7 figures, 10 tables. (ERA citation 04:031994)

TID-4579-R10(Sup.3) PC **A05**/MF **A01**
Department of Energy, Oak Ridge, TN. Technical Information Center.
Energy Information Data Base. Serial Titles, Supplement 3.
Dec 78, 80p

This supplement contains changes and additions to TID-4579-R10 (the authority list for serial titles used by TIC) and is intended to be used with that publication. (ERA citation 04:031996)

5C. Economics

AD-A086 501/4 PC **A03**/MF **A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
Futures Group Periodic Report-2,
Joseph L. Sites, John F. Scott, and Charles W. Taylor. 15 Jun 80, 28p
See also AD-A080 151.

This second Periodic Report of the SSI Futures Group reviews work in progress on Disparities of National Economics and on strategic issues. Summaries of literature and short essays cover expectations of development in mainland China, South and East European social and economic problems, ideologies of economic development, and science and technology for the Third World. The report includes the observation that the Army must expect particular military innovations by other nations in the future to be better, sometimes, than our own.

FRNC-TH-741 PC **A13**/MF **A01**
Paris-1 Univ. (France).
Impact of Electronuclear Industry on French Economy.
J. P. Bertrand. 276p
In French.These (3e Cycle).
U.S. Sales Only.

An analysis of the effects of the French nuclear programme on internal production, international trade and employment in France, between 1976 and 1985, is presented. The contribution of the PWR programme to economic activity, the various branches of industry and manpower utilization is evaluated. After an increase in deficit of the balance of trade, the nuclear industry will limit importations for electricity production and yield an economic rentability. (Atomindex citation 11:506117)

PB80-200454 PC **A18**/MF **A01**
Illinois Univ. at Chicago Circle. Survey Research Lab.
An Analysis of the Economic Progress and Impact of Immigrants.
Final rept.,
Barry R. Chiswick. Jun 80, 407p DLETA-21-06-78-20-1
Grant DL-21-06-78-20

The theoretical analysis of earnings and occupational mobility is based on the international transferability of skills and the favorable self-selection of immigrants. Detailed analyses are performed by race/ethnic group and sex (1970 Census). Immigrants initially have lower earnings than the native born but their earnings rise rapidly with the duration of residence, reach equality after 11 to 25 years and then they have higher earnings. The children of immigrants earn 5 to 10 percent more than those with native-born parents. Using aggregate production function analysis, it is shown that an increase in supply of either low-skilled or high-skilled immigrants decreases the wage of that type of labor, and increases the return to both capital and the other type of labor. The immigration tends to increase the aggregate income of the native population, unless the immigrants are substantial net beneficiaries of income transfers. A bibliography is included.

PB80-200728 PC **A09**/MF **A01**
Swedish Council for Building Research, Stockholm.
Housing Policy and Housing Market Models - Some Dissaggregate Analyses,
Jan R. Gustafsson, Per Holm, Bjorn Harsman, and Folke Snickars. 1980, 187p D16:1980, ISBN-91-540-3233-4
Prepared in cooperation with Ekonomisk Planering, Stockholm (Sweden).

The document discusses the following topics: Housing policy in Sweden; Interaction in a local market (The supply of housing, The demand structure, Simulation of the market processes); Disaggregated demand models (Analyses of local housing markets, Modelling the demand for housing, Forecasting problems); Total demand and allocation (Estimation of the total demand, The concept of housing need, A demand oriented allocation model); Estimation of consumer preferences (Estimation of bid prices, A utility model); Forecasting the consumption (The planning problem, The models utilized, Household and housing stock development, Estimated demand patterns, forecasted consumption patterns).

PB80-200991 PC **A11**/MF **A01**
Mathematics Policy Research, Inc., Princeton, NJ.
Evaluation of the Economic Impact of the Job Program, Second Follow-Up Report.
Final rept. Feb 77-Jul 79.
Apr 80, 238p MEL-80-07
Contract DL-23-34-76-06
Supersedes PB-292 410.

The evaluation is on both (a) the postprogram economic impact of the Job Corps on its participants and (b) the program's economic benefits in relation to its costs. The report addresses the basic issues of whether the sizable investment per youth in Job Corps produces benefits for participants and is 'worth' the costs. The study found that the Job Corps does provide sizable positive effects for participants and that the program's benefits to society in dollar terms substantially exceeds its costs. The study's detailed evidence is based on a tracking of the experience of Job Corps participants and a comparable group of disadvantaged youth who did not participate in the program, for a period up to 2 years after participants left the program.

PB80-201346 PC **A03**/MF **A01**
Environmental Law Inst., Washington, DC.
A Handbook on Scrap Futures Markets and Futures Trading.
Final rept.,
Roger C. Dower, and Robert C. Anderson. Mar 80, 41p EPA-600/9-80-002
Grant EPA-R-804309-01

Market prices for secondary materials are generally characterized by a high degree of variability and uncertainty. Futures markets may be an effective mechanism for stabilizing these prices, and encouraging recovery of secondary materials from solid waste. The desirability and feasibility of implementing futures markets for ferrous scrap and wastepaper were investigated and the results presented at a Symposium held in New Orleans, Louisiana on May 14-15, 1979. A handbook was prepared and distributed to the Symposium participants as a basis for the discussions. The essentials of the handbook and a summary of the comments by those attending are contained in the report.

PB80-202633 PC **A10**/MF **A01**
Industry and Trade Administration, Washington, DC. Office of International Finance, Investment and Services.
The Multinational Corporation. Studies on U.S. Foreign Investment. Volume 1.
Staff economic rept.
Mar 72, 213p
See also Volume 2, PB80-202641.

Volume I presents the following studies: (1) 'Policy Aspects of Foreign Investment by U.S. Multinational Corporations' provides a survey of the role and significance of the multinational corporations and discusses the interaction of the multinational corporation, government and labor, in the areas of employment, technology transfers, investment controls, and the balance of payments. (2) 'U.S. Multinational Enterprises and the U.S. Economy' presents a summary and extrapolation of the conclusions drawn from nine case and industry studies. (3) 'Trends in Direct Investment Abroad by U.S. Multinational Corporations, 1960-1970' provides a statistical analysis of the main elements of the growth in U.S. foreign direct investment during the decade of the 1960's.

PB80-202641 PC **A05**/MF **A01**
Industry and Trade Administration, Washington, DC. Office of International Finance, Investment and Services.
The Multinational Corporation. Studies on U.S. Foreign Investment. Volume 2.
Staff economic rept.
Apr 73, 92p
See also Volume 1, PB80-202633.

Volume II contains two studies that will: (1) assess and analyze the factors that cause U.S. companies to undertake foreign investment, as determined by a survey of multinational companies being conducted for the U.S. Department of Commerce by the Conference Board; and (2) provide statistical data and analyses on the financial, trade and employment effects of a selected sample of U.S. multinational corporations.

PB80-203375 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Economic Development Div.
An Introduction to the COALTOWN Impact Assessment Model.
Staff rept.,
Loyd D. Bender, George S. Temple, and Larry C. Parcels. Apr 80, 33p

The report is a layman's description of the COALTOWN simulation model. COALTOWN simulates future employment, population, wages, migration, state and local tax receipts and intergovernmental transfers, and local government expenditures for counties in Montana, Wyoming, and North Dakota. It is designed to assess impacts of energy projects. Input data and output formats and uses of the model are described. The predictive accuracy of the estimated equations and the model limitations and shortcomings are cited.

PB80-203888 PC **A03**/MF **A01**
National Swedish Inst. for Building Research, Stockholm.

A National Housing Programme as a Stimulus to Development in Building Production,
Gosta Fredriksson, and Lars Olof Lundmark. Feb 80, 47p MEDDELANDE/BULL-M80:6, ISBN-91-540-9080-6

The effects of the development work in the enterprises of a Swedish housing program in the late 60's is discussed in this report. Consideration is given to those aspects of technical and organizational development which have been stimulated by governmental measures to contribute to an increased capacity for international competition among firms in the Swedish building and building materials industry. The study is based on a number of cases from firms in the industries and is built on the theory of the international product life cycle. The paper starts with a brief survey of the Swedish building and building materials industries, the building market in Sweden and of the volume and type of the Swedish construction engagements abroad. The study is explorative and finishes with conclusions in the form of hypotheses for further studies.

PB80-204746 PC **A04**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Water Program Operations.
Report to Congress - Industrial Cost Recovery. Supplemental Analysis and Recommendations.
May 80, 61p
See also PB-292 171.

This document presents the U.S. Environmental Protection Agency's (EPA) supplemental report to the Congress on its Industrial Cost Recovery (ICR) Study as directed by the Congress in Section 75 of Public Law 95-217, the Clean Water Act of 1977. It presents evidence concerning the relative efficiencies of the ICR systems of various grantees, and the construction and operational burdens imposed on grantees by industrial users. It also transmits specific recommendations to the Congress for improving the efficiency of the ICR program.

PB80-204761 PC **A05**/MF **A01**
Purdue Univ., Lafayette, IN.
Net Social Benefits from Diffusion of New Consumer Durable Technologies.
Final rept.,
Frank M. Bass. 1979, 77p NSF/PRA-7715850
Grant NSF-PRA77-15850

A theoretical framework has been constructed to permit the measurement of social benefits associated with the industry development process for consumer durable technological innovations. The framework provides the basis for conservative estimates of these benefits inasmuch as only the price-related benefits are considered and improvements in product quality are ignored. Estimates of the dollar value of social benefits for six consumer durable innovations have been made.

PB80-204795 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Regulatory Impact Statement: Young Chicken Slaughter Inspection Rate Maximums.
Staff rept.,
Clark R. Burbee, and Elwin Guild. Jul 79, 15p

The economic impacts of a proposal to standardize the maximum linespeeds for the inspection of young chickens were assessed. Eight options were evaluated to determine the one that would have the least burden on plants in the industry and the Food Safety and Quality Service (FSQS). Impacts analyzed included those on Federal inspector employment and costs, plant linespeeds and labor productivity and costs, plant employment, length of work week, and processing capacity. This impact statement was prepared for Food Safety and Quality Service as part of the regulatory review requirements.

PB80-204886 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Economic Development Div.
Families with Farm Income, Their Income, Income Distribution, and Income Sources.
Staff rept.,
John C. Crecink. Sep 79, 56p

The report utilizes data from the Farm Family Living Expenditures Survey of 1973 on the income of farm families and on the sources of their income. Nationally, total income for farm families is becoming more equally distributed. Low-farm income or even negative farm income does not necessarily indicate a low family income because over 90 percent of the families had income from at least one other source in addition to farming. Sixty percent received income from off-farm employment. Most low-income farm families were concentrated in the South, particularly in the Appalachian and Delta region. The Corn Belt also had a sizeable number of families whose income was below the poverty threshold. Together the three regions had 52 percent of the low-income farm families.

PB80-205222 PC **A07**/MF **A01**
Georgia Inst. of Tech., Atlanta. Economic Development Div.
The Feasibility of Manufacturing Food Products Machinery in Southwest Georgia.
Rept. for Jun 77-Dec 78,
Tze I. Chiang, and Edwin L. Lewis. Jun 78, 133p CPRC/C-80/14
Contract CPRC-10740070
Sponsored in part by Southwest Georgia Planning and Development Commission, Camilla.

In recent decades the economic growth of the Sun Belt has provided opportunities for southern communities to attract new industrial plants into their area. Plant location decisions are complex and must relate the supply, market and other requirements of the manufacturing process to the resources and attributes of a particular candidate area. This report treats only the food products machinery industry.

PB80-205297 PC **A06**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
The Effects of Environmental Regulations on Cement Production and Expansion in EPA Region V,
Michael Szabo, Vijay Patel, and Richard Gerstle. Jun 79, 112p EPA-905/5-79-001
Contract EPA-68-01-4147

The report presents the results of a study to evaluate the effect of environmental regulations on present production and future expansion capabilities of the 24 active cement plants in U.S. EPA Region V. This study was done in response to allegations that environmental regulations are a significant factor in the present Midwest cement shortage. The results of a survey of these 24 plants show that environmental regulations are not significantly affecting overall cement production in Region V. However, retirement of 13 percent of present cement capacity in Region V without replacement, from 1975 to 1978, has probably aggravated the shortage situation. Environmental regulations are apparently a major factor in the reluctance of cement companies to expand capacities. This situation may change in the near future as rising cement prices improve the return on investment from plant expansion, and as acquisitions of smaller cement companies by larger corporations increase the financial capability to expand.

PB80-206147 PC **A13**/MF **A01**
Wharton School, Philadelphia, PA.
The Impact of ERISA (Employment Retirement Income Security Act) on the Investment Policies of Private Pension Funds and Capital Market Efficiency.
Final rept.,
J. David Cummins, John Percival, and Randolph Westerfield. Apr 80, 277p
Contract DL-J-P-P-6-0209

The study is designed to report on the effects ERISA has had on: (1) the attitudes and perceptions of those involved in the investment management of private pension funds concerning the major provisions of ERISA, and their assessment of the likely impact of ERISA in investment management; (2) the investment behavior of private pension funds; and (3) capital market efficiency. The study provides a detailed description of the position of private pension funds in the markets for fixed income securities and common stocks. It also shows the changes in portfolio mix between bonds and common stock that occurred in recent years, before and after ERISA. Chapter 1 presents analyses of data used in examination and results. Chapters 2 and 3 provide the results of attitudinal questionnaires sent to plan administrators and investment managers to evaluate such matters as the level of understanding of fiduciaries of the relevant provisions of ERISA. Chapter 4 is intended to determine whether the concentration that characterizes the equity investment has changed since the passage of ERISA. The objective of chapter 5 is to provide an analysis of the effects of trading imbalances on common stock prices and to identify any resulting capital market inefficiencies.

PB80-206220 PC **E04**/MF **E04**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Modeling Urbanization and Economic Growth.
Final rept.,
A. C. Kelley, and J. G. Williamson. May 80, 93p RR-80-22

The report describes a prototype model of the urbanization and development process. It sets out a general equilibrium perspective that illuminates several fundamental aspects of the process of demoeconomic structural change and synthesizes the glowing recent literature on general equilibrium modeling of dualistic development. When subjected to empirical analysis it should be capable of describing the past and of assessing alternative future consequences of rapid urbanization and growth.

PB80-206956 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Regulatory Impact Statement: Modified Traditional Poultry Inspection.
Staff rept.,
Clark R. Burbee. Jul 79, 17p

The economic impacts of a proposed rule to modify the procedures used to inspect young chickens were assessed. Five options were evaluated to determine the one that would have the greatest impact on increased efficiency in processing and inspection. Impacts analyzed included those on labor and inspector productivity and costs, industry processing capacity, employment and energy use, product prices and government costs. The impact statement was prepared for Food Safety and Quality Service as part of the regulatory review requirements.

PB80-207665 PC **A08**/MF **A01**
United Indian Tribes of Western Oklahoma and Kansas, Inc., Shawnee, OK.
A Feasibility Study of a Through-The-Blue-Tannery on Tribal Lands in Anadarko, Oklahoma.
Jul 80, 155p EDA-80-0106
Grant EDA-08-06-02144

The feasibility study of a 3,000 hide/day through-the-blue tannery to be located in Anadarko, Oklahoma, recommends that the KCA Land Use Committee retain an existing U.S. tanning firm to manage and operate the plant in order to maximize the return to the tribes. The study also projects that, after allowing for all operating costs and the amortization of all fixed capital loans, the plant will generate $1,655,234 in capital.

PB80-209406 PC **A05**/MF **A01**
Kane (Donald I.) Associates, Chicago, IL.
Conference on EDA Development Financing, Meeting of August 22, 1979, Chicago, Illinois.
1979, 82p EDA-ERD-80-158
Grants EDA-ERD-718-G-79-53, EDA-99-7-13526
See also PB80-209414.

The intent of this conference was to examine the prospects of EDA's Development Finance Program to accomplish its stated goals given the resources and tools provided under pending legislation. The project concerns itself with the following principal issues: (1) The problem of processing $1.8 billion in loan guarantee authority without substituting for credit available elsewhere; (2) An allocation formula sensitive to different and changing credit needs of eligible areas; (3) Effective use of grants and interest rate subsidies to improve the investment climate in distinctly different designated areas.

PB80-209414 PC **A06**/MF **A01**
Kane (Donald I.) Associates, Chicago, IL.

Development Financing in Eligible and Distressed Areas.
Final rept.,
Donald I. Kane. 1980, 113p EDA-ERD-80-157
Grants EDA-ERD-718-G-79-53, EDA-99-7-13526
See also PB80-209406.

The intent of this report is to examine the prospects of EDA's Development Finance Program to accomplish its stated goals given the resources and tools provided under pending legislation. The project concerns itself with the following principal issues: (1) The problem of processing $1.8 billion in loan guarantee authority without substituting for credit available elsewhere; (2) An allocation formula sensitive to different and changing credit needs of eligible areas; (3) Effective use of grants and interest rate subsidies to improve the investment climate in distinctly different designated areas.

SAND-79-1292C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Advantage of Loan Leveraging in Commercial Solar Process Heat Applications.
W. P. Schimmel, Jr., and K. D. Bergeron. 1979, 5p CONF-791024-6
Contract EY-76-C-04-0789
Solar industrial process heat conference, San Francisco, CA, USA, 31 Oct 1979.

In a majority of the solar/thermal studies to date, a utility economic methodology has been used to assess the potential of solar power systems. The utility sector is precluded from taking advantage of loan leveraging because the effective rate of return is artificially set. Utilities are regulated by public commissions and thus must finance new capital investments according to a prescribed set of rules on after tax cost of capital and fixed charge rates. Commercial ventures have no such externally imposed constraints and make decisions for capital expenditures which include the effect of loan leveraging. The relevant parameters for a commercial institution are interest rate on debt, a discount rate which accounts for risk, and the effect of favorable tax incentives. An expression is developed for a capital cost factor which contains these parameters. Results are shown for various downpayments and discount rates. It will be shown that the effect of loan leveraging can be substantial in affecting the penetration of solar process heat into the commercial energy market. In addition, the relation between loan leveraging and risk is investigated. (ERA citation 05:008342)

SERI/TR-53-100 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Review of Regional Economic Models with Special Reference to Labor Impact Assessment.
G. Ferris, and B. Mason. Jun 79, 48p
Contract EG-77-C-01-4042

This paper reviews several regional economic models and examines the capabilities of these models for assessing the total employment impacts of solar energy adoption. Five generic analytic methods are discussed: economic base analysis, shift-share analysis, demographic-economic interaction models, input-output analysis, and industrial location analysis. Ten regional models incorporating some aspect of these methods are reviewed. From the model review, the conclusion is drawn that there is no single model that fits all of the necessary criteria for planned research efforts. Models that appear to hold promise are the Economic Activity Analysis (EAA) Model, the Regional Industrial Multipliers System (RIMS), the Multiregion, Multi-industry (MRMI) Model, and the MULTIREGION model. (ERA citation 05:002724)

UCRL-15075 PC **A06**/MF **A01**
Runzheimer and Co., Inc., Rochester, WI. Living Cost Div.
Runzheimer Plan of Living Cost Standards.
W. J. McDonough. 31 Aug 79, 105p
Contract W-7405-ENG-48

Tabulated data on living costs for a family of 4 with an annual income of $40,000 are presented for nine US urban areas. Living costs for taxation-transportation-housing are separated from all other costs. These data serve as a guide for the determining fair salary adjustments to employees who are asked to permanently relocate. (ERA citation 05:001155)

5D. History, Law, and Political Science

AD-A086 448/8 PC **A03**/MF **A01**
Operational Research and Analysis Establishment Ottawa (Ontario)
The SALT Treaty from a Canadian Point of View,
G. R. Lindsey. Apr 80, 36p Rept no. ORAE-R74
Abstract in French.

With or without SALT II there are several strategic imbalances that will cause difficulties in the years ahead. Ratification of SALT II will not solve them, but it would permit programs that would redress them, and would preserve the opportunity to negotiate agreements in the future that could reduce the probability that each side will simply try to solve its problems by extensive uncontrolled buildup of weapons. All the SALT II protocol does is to confirm that any form of arms control over mobile ICBMs or cruise missiles was too difficult to complete in 1979. What with the problems of cruise missiles, European systems threatening the USSR directly, and the existence of independent British, French, and Chinese nuclear forces, a SALT III that addressed these subjects would face extreme difficulties, with little hope of easy or early progress. Canada has a vital interest in the preservation of strategic nuclear deterrence, enhanced by our geographic location down-wind from US missile fields. She also has a stake in the success of nuclear deterrence in Europe. (Author)

AD-A086 568/3 PC **A11**/MF **A01**
Naval Postgraduate School Monterey CA
Soviet Strategy in the Red Sea Basin.
Master's thesis,
William Augustine Nurthen. Mar 80, 240p

The Red Sea basin lies within a region syllogized variously as the 'arc of instability,' the 'crescent of crises' and the 'crumbling triangle.' Regardless of the metaphor utilized, this volatile cul-de-sac pulses with instability. The pattern of Soviet strategy that emerges for the Red Sea basin indicates not a grand design, but rather an attempt to manage regional instability in accordance with Russian national interests. Destabilizing events provide Moscow with targets of opportunity which are selectively exploited to achieve foreign policy goals. These goals are strategic, political and economic in nature. Naval diplomacy implemented by the maturing Soviet Navy comprises an essential and, at times, decisive element of the overall strategy for the Red Sea basin. Frequently, the Soviet military assistance program, assiduously cultivated in the region, provides the exploitive vehicle with which to capitalize on targets of opportunity generated by the persistent patterns of instability. Moscow's strategy for the Red Sea basin is supported by the major components of the Soviet bureaucracy: defense and heavy industries, armed forces, fishing and maritime fleets and ideological agencies. It is unlikely to change in the aftermath of the Brezhnev succession. (Author)

AD-A086 569/1 MF **A01**
Naval Postgraduate School Monterey CA
The Implications of Eurocommunism for the NATO Alliance: A Case Study of Italy and the PCI.
Master's thesis,
Darlene Weidler Vatikiotis. Mar 80, 159p
Availability: Microfiche copies only.

The rise of Communism in Western Europe in recent years poses a significant challenge to both the West and the East. This study examines aspects of the phenomenon of Eurocommunism and its effect upon the NATO Alliance; presents the differing nuances and significance of Eurocommunism; and offers an historical overview of Eurocommunism and, specifically, the Italian Communist Party (PCI). A discussion of the Alliance identifies recent important developments, the Italian contribution to NATO, and the United States' interests in the NATO Alliance. The military and defense policies of the Italian Communist Party are discussed and the likelihood of its attaining a position of power in a future government is analyzed. The results of recent elections in Italy are examined in this study, as well as alternatives to NATO. (Author)

AD-A086 601/2 PC **A04**/MF **A01**
Air War Coll Maxwell AFB AL
Iran: Regional Stability.
Professional study,
Habibollah Khameneh, and Hamid Shirazi. Apr 75, 60p 5657, FAR-23946

In this paper, the authors examine Iran's essential elements of power by studying its past experiences (from the Second World War to the present time) in recovering from the effects of the war, its dealings with Communism, the handling of its internal difficulties, measures taken by it against outside influences, planning of its successful economic growth, progress made in its approach to mass education, the process of its becoming an industrial nation in a relatively short period of time, the building of a comparatively strong military force, and last but not least, its former leader.

PB80-203722 PC **A06**/MF **A01**
National Park Service, Denver, CO. Denver Service Center.
Historical Data, Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park, Fredericksburg, Virginia - Ellwood-Lacy House.
Historic structure rept. 1770-1980,
G. Frank Williss. Apr 80, 102p FNP-560-80-6

The report contains a brief section on the administrative data and the significance of Ellwood. The history of the house begins with William Jones who leased the land in 1777 and later purchased it in 1788. The report relates the history of his family and his daughter Betty Lacy who lived at Ellwood until 1857 when she moved to 'Chatham' in Fredericksburg. The significance of the structure stems from its use as a Confederate field hospital during the first Battle of the Wilderness and then as General Warren's headquarters during the second Battle of the Wilderness. The property left the hands of the Lacy family in 1907, when it was sold to Hugh Willis. Ellwood was sold to the National Park Service in 1971. The report concludes with sections on the construction and physical history of Ellwood and the Ellwood myths. The illustrations consist of photographs, maps, and source documents. The appendixes include inventories and legislation.

PB80-204621 PC **A99**/MF **A01**
National Park Service, Denver, CO. Denver Service Center.
Seacoast Fortifications, San Francisco Harbor, Golden Gate National Recreation Area, California.
Historic resource study rept. 1776-1979,
Erwin N. Thompson. May 79, 653p FN-560-80-7

This historic resource study details the history of the seacoast fortifications of the San Francisco harbor. The report is divided into nine sections. The first seven sections are divided by periods of time beginning with 1776-1876 and ending with the Postwar (World War II) Plans. The eighth section consists of the conclusions and recommendations for the structures. The ninth section concentrates on the List of Classified Structures (LCS) for the area and includes those structures recommended for inclusion. The study goes into the history of each fortification rather extensively and mentions the men responsible for the system. There is a bibliography, illustrations, historic drawings, and a historic base map at the end of the report.

5E. Human Factors Engineering

AD-A086 517/0 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Application of Color Coding in Tactical Display S-3A.
Technical rept.,
Douglas E. Neil. Apr 80, 57p Rept no. NPS55-80-113

The present effort was designed to examine the literature on color coding in terms of the incorporation of color in tactical displays aboard the S-3A. Available literature could be conveniently separated into work concentrating on visual functioning,

display/environmental factors, task/performance variables. Overall the results do not strongly support the inclusion of color in S-3A tactical displays. In the event color is incorporated, its usage should be at the control of the operator. (Author)

INIS-mf-5195 PC **A25**/MF **A01**
Technischer Ueberwachungs-Verein Rheinland e.V., Cologne (Germany, F.R.). Inst. fuer Unfallforschung.
Human Factors in Nuclear Power Plants.
E. Bohr, J. Hennig, W. Preuss, and G. Thau. 1977, 576p
In German.
U.S. Sales Only.

This report describes the results of a study on the functions of operating and maintenance personnel in nuclear power plants. Since an effective power plant design must take into systematic account the possibilities and limitations of the human element, the basic aim of the study was to identify what the human operators are required to do and how they achieve it. Information was acquired by direct observation and by interviews as well as by evaluation of written documents (e.g. incident reports, procedures manuals, work regulations) and of working conditions (e.g. equipment and workplace design). A literature search and evaluation carried out within the scope of this study has been published as a separate document. The main part of the report is devoted to discussions and conclusions on selected areas of potential improvements. The topics include control room design, factors of the physical environment including radiation, problems of maintainability, design of written documents, problems in communicating information, design and control of tasks, placement and training. A separate section deals with problems of recording human errors. (Atomindex citation 11:502923)

5F. Humanities

PB80-198476 PC **A02**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Anthropology.
A Survey and Evaluation of Cultural Resources. Phase II of the Oroville-Tonasket Unit Extension.
Final rept.,
Sandra L. Snyder, and William D. Honey. Apr 80, 25p
Contract DI-8-07-10-S0079

The Department of Anthropology of Oregon State University has completed a cultural resource survey of Phase II of the Oroville-Tonasket Unit Extension. Research involved a field survey to identify prehistoric and historic sites, structures, and objects which might be impacted by this project. Research also examined the broader regional prehistory and history of the area. Methods of survey and results of the reconnaissance are summarized and a pertinent bibliography is provided. The reconnaissance revealed no archaeological or historic sites.

PB80-202013 PC **A04**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Anthropology.
A Survey and Evaluation of Cultural Resources: Phase I of the Oroville-Tonasket Unit Extension.
Final rept. 1978-79,
William D. Honey, John A. Draper, and Sandra L. Snyder. Dec 79, 67p
Contract DI-8-07-10-S0079

The report details the results of a cultural resources survey in the upper Okanogan River Valley in north-central Washington, and contains ethnographic and historical overviews of the area. The survey was an intensive ground search of the Phase I impact area of the Oroville-Tonasket Unit extension being constructed by the Water and Power Resources Service. Approximately 25 miles of proposed pipeline route, pumping stations, and small reservoir sites were inspcted between the towns of Oroville and Ellisford. One suspected prehistoric site was archeologically tested at the proposed location of a riverside pumping station. A hand excavated pit and a backhoe trench recovered no cultural materials. Based on the above operation, and the overviews, it was concluded that Phase I of the proposed irrigation project would not adversely affect any cultural resources.

5G. Linguistics

AD-A086 735/8 PC **A04**/MF **A01**
Yale Univ New Haven CT Dept of Computer Science
Affect Units and Narrative Summarization.
Research rept.,
Wendy G. Lehnert. May 80, 59p Rept no. RR-179
Contract N00014-75-C-1111, Grant NSG-IST79-18463
Errata sheet inserted.

The analysis of narrative text involves various levels of description. On the lowest level are word meanings and syntactic structure within single sentences. On a higher level there are problems of generating inferences and integrating information into memory. At the highest level is the notion of a macro-structure or narrative plot. The identification of high-level narrative structures is central to the problem of narrative summarization. But the intuitive notion of a plot is useless for a process model of summarization unless we can specify the hierarchical representations that allow us to analyze input and produce plots as output. A representational strategy has been developed for high-level structural analysis in conjunction with the BORIS system (a narrative text understanding system). The structures produced effectively encode plot lines in terms of connected graph structures where graph nodes correspond to specific affect units. An affect unit is an abstraction of affective causalty which is recognized in a bottom-up manner at the time of understanding. Simple manipulations of these graph structures yield the conceptual basis for narrative summaries, but the actual process of summarization depends on certain connectivity properties in the graph structure.

5H. Man-Machine Relations

AD-A086 459/5 PC **A04**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Evaluation of a Gunnery Simulator's Visual Display and Several Strategies for Leading Moving Targets.
Final rept. Oct 77-Sep 78,
Brian L. Kottas, and David W. Bessemer. Oct 79, 58p Rept no. ARI-TR-427

The presence of high-speed armor targets on the modern battlefield necessitates training gunners to judge target speeds in order to apply appropriate leads. The current research investigated trainees' speed judgments of a moving target and spatial estimates of a gunnery simulator's visual display. Distance, range, and slant estimates in the simulator revealed systematic underestimation of distance and range, overestimation of slant, and large inter-observed variability, a pattern of results typical of research on space perception. Application of speed judgment data to a model of tank gunnery indicated that asking gunners to classify target speed as either fast, medium, or slow and to apply one of three corresponding leads should prove an effective lead strategy. Application of the data to the gunnery model demonstrates that selection of a cognitive strategy for training may have an impact on operational performance. The current research will be of value to instructional system developers, because it demonstrates the importance of unobservable processes, such as cognitive strategies, for training. (Author)

AD-A086 484/3 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
Perceptual Capabilities Required to Operate Visual Sonar Displays.
Interim rept.,
Jo Ann S. Kinney, S. M. Luria, and Alma P. Ryan. 27 May 80, 18p Rept no. NSMRL 931

The purpose of this research was to determine which skills and abilities are needed for operators of visual sonar displays. A standard procedure for occupational testing was employed: that is, a large group of men was given a battery of tests of abilities (visual, perceptual, cognitive, etc.) that were thought to be important to being a good operator of visual sonar displays. The men were then evaluated by their supervisors and by other sonar technicians (peers) for proficiency as sonar operators and the results from the test battery were correlated with these assessments. Several analyses showed that a small group of measures from the test battery differentiated among good and poor operators. For example, the use of GCT, time in service, near acuity, near lateral phoria, texture discrimination, and an attitude test gave a moderate (R approximately equal to .50) and highly significant ($p < .01$) correlation with proficiency ratings. The implications are that a number of perceptual motivational, and intellectual factors are important for operators of visual sonar displays and that good performance can be adequately predicted if these factors are properly tested. (Author)

5I. Personnel Selection, Training, and Evaluation

AD-A086 346/4 PC **A10**/MF **A01**
RAND Corp Santa Monica CA
DoD Survey of Officers and Enlisted Personnel: Survey Design and Administrative Procedures (1978).
Interim rept.,
Zahava D. Doering, David W. Grissmer, Jennifer A. Hawes, and William P. Hutzler. Apr 80, 209p Rept nos. RAND/N-1458-MRAL, RAND/N-1458-AF
Contract MDA903-77-C-0108

This study program seeks to develop broad strategies and specific solutions for dealing with present and future defense manpower problems. These goals require new methodologies for examining broad classes of manpower problems as well as specific problem-oriented research. In addition to analyzing current and future manpower issues, it is hoped that this study program will contribute to a better general understanding of the manpower problems confronting the Department of Defense. A key component of the program is the development of DoD-wide data bases that can support the policy research and analysis necessary for dealing with present and future defense manpower problems. Such data should include information about the behavior, experiences, attitudes, preferences, and intentions of military personnel. Particularly if collected on a periodic basis, these data would be helpful in assessing the response of military personnel to past or current policy chanes and could be used to identify future areas for policy action. This note provides an overview of the design together with a description of the field procedures for one of the major data bases created in this program.

AD-A086 360/5 MF **A01**
Adjutant General'S Office (Army) Washington DC
Morale Support of Reserve Components during Training, Mobilization, Deployment, and Combat,
Darrell F. Rishell. Aug 79, 99p
Availability: Microfiche copies only.

The 'Morale Support of Reserve Components During Training, Mobilization, Deployment and Combat' study was conducted to review this subject from a historical point of view. Assess current policies and condition and recommend action as appropriate. Study conclusions are as follows: (a) No adequate statement for establishing policy, responsibilities, administrative procedures, or operational guidance for Morale Support in a theater of operations exists, (b) The current TOE 12-530 designed for use under mobilization in theater of op-

erations is too restrictive to meet recreational needs, (c) Authorization for Morale Support (MS) personnel in the MTOE's of USAR Training Division are inadequate, (d) Need exists for school training of officer and enlisted MS personnel, (e) Planning for assistance to RC dependent personnel during mobilization is inadequate, (f) RC personnel and dependents should become more involved in military community, and (g) Detailed planning for acquisition and movement of MS supplies and equipment to operations is needed.

AD-A086 399/3 PC **A07**/MF **A01**
Human Resources Research Organization Alexandria VA
The Retention of Tank Crewman Skills.
Final rept. Jun 78-Jun 79,
William C. Osborn, Charlotte H. Campbell, and James H. Harris. Dec 79, 137p HUMRRO-FR-WD(KY)-79-3, ARI-RR-1234
Contract DAHC19-76-C-0001

This research was conducted to study the retention of armor crewmen skills from the time of training through the early months of job assignment. Performance tests of job tasks were administered to soldiers in two Armor MOS at the end of formal training and again after four to eight months on the job. Proficiency overall remained unchanged from school to the field, but when examined by task category it was found to decline for tasks common to all crewmen and to increase for tasks specific to a crew position. No systematic changes in proficiency occurred as a function of time since training or relevance of job assignment. Results were discussed in terms of task characteristics and procedural factors. (Author)

AD-A086 403/3 PC **A05**/MF **A01**
Training Analysis and Evaluation Group (Navy) Orlando FL
Selection, Training, and Utilization of Navy Recruit Training Command Officers.
Final rept. Feb-Oct 79,
Thomas F. Curry, Jr., and D. Robert Copeland. May 80, 81p Rept no. TAEG-81

This report addresses the selection, training, and utilization of officers assigned to the Navy Recruit Training Commands. It is one in a series of reports concerned with how to optimize Navy Recruit Training to meet the needs of the post-1980 period. The report provides a comprehensive review of the officers assigned to a Division of the Navy Recruit Training Commands. Selection criteria, function, training, and duties of these officers have been studied. A comparison is made between the Navy division officer and similar officers of the Army, Air Force, Marine Corps, and Coast Guard concerning their selection, training, and utilization. Recommendations are given for optimizing the standard training curriculum, selection, and roles of division officers assigned to recruit training. (Author)

AD-A086 406/6 PC **A03**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Effects of Presentation- and Test-Trial Training on Motor Acquisition and Retention.
Technical rept.,
Joseph D. Hagman. Jan 80, 33p Rept no. ARI-TR-431

THis report examined the relative effects of three different training methods on the acquisition and retention of a positioning motor task. Three independent groups of subjects (N = 15 per group) performed three training trial cycles consisting of six trials each. Training methods differed in their emphasis on presentation (k) and test (t) trials during each cycle. For one group, a cycle consisted of three p- and t-trials administered in alternation. For another group, the first five trials of each cycle were p-trials and the sixth was a t-trial. For the last group, the first trial was p-trial and the next five were t-trials. Group acquisition performance was compared at the last trial of each cycle while retention was compared 3 min. and 24 hr. after acquisition. Absolute error scores indicated that acquisition and short-term retention were best when training emphasized p- and t-trail alternation and p-trial repetition within cycles, whereas long-term retention was best when training stressed t-trial repetition. Results suggest that testing is an effective way to enhance long-term retention of motor skill. This enhancement could be realized by changing the emphasis of training from presentation to testing without added expenditures in training time, money and personnel. If, instead of long-term retention, the goal is rapid acquisition and short-term retention, training methods which emphasize either alternation of presentation and testing or repeated presentation would be most effective.

AD-A086 457/9 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Human Decision-Making in Computer Aided Fault Diagnosis.
Final rept. Mar 78-Jul 79,
William B. Rouse, Sandra H. Rouse, Ruston M. Hunt, William B. Johnson, and Susan J. Pelligrino. Jan 80, 35p ARI-TR-434
Grant DAHC19-78-G-0011

This report summarizes a series of six experiments conducted to increase our understanding of human performance on diagnostic tasks, and in the process to investigate the feasibility of using context-free computer-based simulations to train troubleshooting skills. Three simulated diagnostic tasks were developed: a simple context-free task, a complex context-free task, and a context-specific task (simulation of aircraft powerplants). The six experiments evaluated the effects of computer aiding on performance of each task and on subsequent unaided performance, using different task mixes, subjects (4 to 48 engineering or technical trainees), and conditions (self-pacing vs. forced pacing; feedback loops). Computer aiding reduced the number of tests required to diagnose simple problems and enhanced subsequent unaided performance except when subjects were under time pressures. Training on the simple task with computer aiding first inhibited and then enhanced performance on the complex context-free task. Training on the context-free tasks improved performance on the context-specific task. Results provide a data base for both theoretical issues in fault diagnosis and practical application of computer aiding to live system performance. (Author)

AD-A086 525/3 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
Adequate Compensation for a Permanent Change of Station Move: A Study Comparing the Policies of the Military, Civil Service, and Private Sector.
Master's thesis,
Gregory Lee Hansen, and Dwight Warner Handforth. Mar 80, 130p

Military members, by virtue of the requirements of military service, are frequently required to move. The adequacy of compensation granted a military member for costs incurred during a permanent change of station transfer has been questioned. To determine whether or not this reimbursement is adequate, situation models of typical moves are developed. The constructive costs of these transfers are compared with the entitled reimbursements received by military members, Civil Service employees, and private sector employees. Comparisons among these groups indicate significant disparities. Recommendations are made to alleviate identified disparities between actual costs incurred and reimbursements granted for military members. The impact of each of these recommendations on the Department of Defense budget is developed. (Author)

AD-A086 545/1 PC **A08**/MF **A01**
Training Analysis and Evaluation Group (Navy) Orlando FL
Electronic Warfare Training Analysis.
Final rept.,
William P. Lane, Bernard J. McElvenny, Willard B. Stubbs, Edward O. Moore, Jr., and Ted E. Pearson. 1972, 168p Rept no. TAEG-4

This report describes the findings from an analysis of the training requirements for electronic warfare equipment operators, and supports the feasibility and desirability of a consolidation of training for operators of air, surface, and subsurface EW equipment. The report contains a proposed curriculum for the consolidated training program and a description of a generalized operator training system. Actions for improving the effectiveness of existing EW training facilities are recommended. (Author)

AD-A086 566/7 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
A Diffusion Approximation Analysis of the Supply Corps Officer Manpower System.
Master's thesis,
Armando R. Solis. Mar 80, 77p

A stochastic analysis of the Supply Corps officer manpower system is presented. The analysis is based on the concept of diffusion approximations. The state of a rank is represented as the superposition of the deterministic process, and a random noise variable, both of which are derived utilizing a set of formulated recursion equations. Numerical results are presented for a 3-rank system and compared against a simulation of a Markovian manpower model. (Author)

AD-A086 589/9 PC **A04**/MF **A01**
Human Resources Research Organization Alexandria VA
Tank Platoon Training Program Outline for USAREUR Units.
Final rept.,
Wendy J. McGuire, and Gray Kress. Feb 80, 70p ARI-RR-1239
Contract MDA903-78-C-2042

This report presents a training program outline for preparing tank platoons to perform to standards in the Table IX Tank Platoon Battle Run. The program is designed for use at local training areas. It describes procedures for exercising all functional tasks of the Platoon Battle Run and offers suggestions for evaluating performance on the exercises. Included are: (1) a functional task analysis of the Platoon Battle Run; (2) a description of operational tasks in which the functional task are exercised; and (3) suggested training methods for the operational tasks, utilizing non-fire dry runs, subcaliber fire and scaled ranges, simulated fire and maneuver, and terrain boards/sand tables. The training program outline is designed specifically for use with the M60A1 tank system. (Author)

AD-A086 591/5 PC **A03**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
The Applicability of the ISD 4-Factor Model of Job Analysis in Identifying Task Training Priority in Nine Technical Military Occupational Specialties.
Technical rept.,
Guy L. Siebold. Oct 79, 36p Rept no. ARI-TR-432

The object of the research was to assess the applicability of the Instructional Systems Development (ISD) job analysis procedures to nine technical aviation maintenance military occupational specialties (MOS). Job analysis questionnaires were developed for each of the nine aviation maintenance MOS's. The questionnaires consisted of several background items and a list of tasks performed in the pertinent MOS. Research teams administered the questionnaires to groups of job incumbents and supervisors at numerous CONUS and overseas installations. About one third of the incumbents and supervisors in each of the nine MOS's completed the questionnaires. Job incumbents rated their applicable tasks on a Relative Time Spent Performing scale. Supervisors rated all their MOS tasks on four scales: Task Learning Difficulty, Consequences of Inadequate Performance, Immediacy of Task Performance, and Type of Training. (Author)

AD-A086 593/1 PC **A04**/MF **A01**
Kinton Inc Alexandria VA
Integrated Personnel and Training Information for TRADOC System Managers (TSM): Technological GAPS.
Final technical rept.,
C. Dennis Fink, and William A. Carswell. Feb 80, 54p ARI-RR-1238
Contract DAHC19-78-C-0032

The Integrated Personnel Support (IPS) model outlines the procedures that should be followed during the development of personnel and training subsystems for new materiel systems. This report identifies some of the technological problems that must be solved. These problems or 'technological gaps' were identified during an extensive literature review for, and the subsequent development of, a

handbook for TRADOC System Managers (TSM). Most of the technological gaps related to deficiencies in procedures for estimating training and personnel requirements, and for the development of training strategies, during Phase I and II of the Army's Life Cycle System Management Model (LCSMM). Specifically, there was found to be an absence of satisfactory techniques for (a) deducing training and personnel requirements from materiel characteristics; (b) identifying excessive human resources demands stemming from materiel concepts; (c) identifying functions most appropriately performed by equipment, by persons, or by a man-machine combination; (d) generating task analytic data during Phase I of the LCSMM; (e) identifying high-risk training tasks during Phase I of the LCSMM; (f) indicating appropriate training strategies before actual hardware is developed; and (g) describing human resources data/requirements/contraints meaningfully to design engineers.

AD-A086 594/9 PC **A06**/MF **A01**
Air Force Occupational Measurement Center Randolph AFB TX
Services, Meatcutters, and Subsistence Operations Career Ladders, AFSCs 611X0, 612X0, and 612X1 (Previously 611X0 and 611X1).
Occupational Survey rept.
May 80, 117p

This report presents the results of a detailed Air Force occupational survey of the Services (AFS 611X0) and Meatcutter (AFS 611X1) specialties. The report was requested by Lowry Technical Training Center (LTTC). The primary objective of the survey is to provide current data on jobs and tasks performed by career field members, with particular emphasis on tasks performed by billeting personnel who were merged into the 611X0 career field in 1978. Authority for conducting occupational surveys is contained in AFR 35-2. Computer outputs used to analyze the information for this report are available to operations and training officials.

AD-A086 638/4 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
Increasing the Utility of the Human Resource Management (HRM) Survey.
Master's thesis,
Frank G. Dengler. Mar 80, 119p

The Human Resource Management (HRM) Survey is routinely administered to units of the U.S. Navy in order to collect demographic and attitudinal data. The focus of the attitudinal questions is on relatively abstract organizational and interpersonal characteristics. The primary employment of the survey results is in stimulating discussions amongst respondents at the unit or work group level leading to the recognition of problem areas and commitment to corrective action plans. The HRM Survey has the potential to collect and process data which could provide statistically significant inputs to decisions on specific policy and resource allocation decisions at all levels of the naval service. The recommendations contained in this thesis are intended to assist in the realization of that potential. (Author)

AD-A086 696/2 PC **A02**/MF **A01**
Houston Univ TX Dept of Psychology
A Re-Examination of the Mobley, Horner & Hollingsworth Model of Turnover: A Useful Replication.
Technical rept.,
Susan Coverdale, and James R. Terborg. Mar 80, 22p Rept no. TR-80-4
Contract N00014-78-C-0756

The empirical validity of the Mobley, Horner & Hollingsworth model of employee turnover was tested with clerical employees. Results were consistent with the model in that only intention to quit exhibited a significant regression coefficient in the prediction of turnover. Implications for future research in the area are discussed. (Author)

AD-A086 763/0 PC **A08**/MF **A01**
Naval Training Device Center Orlando FL
Naval Training Equipment Center Index of Technical Reports,
Roberta Nelson. Jun 80, 168p Rept no. NAVTRADEV-P-3895
Supersedes report dated May 78, AD-A057 978.

This index lists published Naval Training Equipment Center technical reports and technical notes available through the Defense Technical Information Center, Cameron Station, Alexandria, Virginia 22314, which have resulted from basic research, exploratory development, and advanced development type projects. This index also contains a list of Naval Training Equipment Center patents (in-house and contractor). (Author)

AD-A086 798/6 PC **A02**/MF **A01**
Army Training and Doctrine Command Fort Monroe VA
TRADOC Evaluation - Basic Skills Education Program. Phase I, BSEP I. Revised.
11 Jun 80, 23p
Supersedes report dated Feb 80, AD-A083 924.

BSEP I, consisting of instruction in literacy and English-as-a-Second Language(ESL), was created as an on-duty remedial education program during initial entry training for Regular Army, Army National Guard, and Army Reserve personnel on active duty for initial entry training. The program consisted of: counseling/diagnostic testing; instruction in reading and arithmetic (BSEP I-Literacy); and instruction in English-as-a-Second Language (BSEP I-ESL). The reading and arithmetic components were targeted at enlistees who scored less than 19 on the SelectABLE test--roughly reflecting a grade level (GL) of approximately the 5th grade--and those who scored less than 70 on the English Comprehension Level Test--reflecting a probable difficulty in communicating in English. The following are among the conclusions of this study: (1) Less than 10% of BSEP I eligibles are from mental categories I and II of the AFQT; (2) SelectABLE is a resonable valid predictor of difficulty with reading/math during initial entry training; (3) The SelectABLE score of 19 did not identify all those who may need BSEP I instruction; and (4) BSEP-I-ESL is an effective preparation for initial entry training.

AD-A086 827/3 PC **A03**/MF **A01**
Naval Surface Weapons Center Dahlgren VA
Anticipating the Software Engineer: The Academic Preparation.
Final rept.,
Richard E. Nance, and Walter P. Warner. May 80, 34p Rept no. NSWC/TR-80-108

Beginning with the specification of the knowledge required to develop systems at the Navy Surface Weapons Center (NSWC), this report focuses on the identification of the knowledge to be gained through academic preparation and on-the-job experience. Discrimination of the relative importance of knowledge areas also enables the distinction between software and systems engineers. A review of efforts to define software engineering and to provide academic programs leads to the conclusion that NSWC requirements are not atypical. Conclusions and recommendations on the development of software engineers specifically treat the issues of the definition of software engineering, the confusion between software and systems engineers, the areas of academic preparation, the knowledge background to be gained through experience, and the necessary training of management with regard to software development technology. (Author)

AD-A086 848/9 PC **A04**/MF **A01**
Technomics Inc Oakton VA
A System Approach to Navy Medical Education and Training. Appendix 37. Competency Curricula for Respiratory Therapy Assistant and Respiratory Therapy Technician.
Final rept.
31 Aug 74, 63p
Contract N00014-69-C-0246
Appendix 37 to AD-A085 675 and AD-A085 676. See also Appendix 40, AD-A085 909.

For abstract see AD-A086 675.

AD-A086 880/2 PC **A03**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
The Keyword Method of Vocabulary Acquisition: An Experimental Evaluation.
Technical rept.,
Douglas Griffith. Jan 80, 40p Rept no. ARI-TR-439

An experiment assessed the effectiveness of a mnemotechnic (memory technique), the keyword technique, for learning foreign language vocabulary. Participants were 60 Army enlisted personnel, 20 from each of the following ranges of general technical (GT) aptitude: 90 and below, 91-109, and 110 and above. All personnel learned the English translations of 15 Korean vocabulary terms at a self-paced rate. Half the personnel in each group were instructed in the keyword technique and were supplied keywords for each vocabulary item, whereas the remaining personnel served as a control group. According to the most representative criterion, the keyword group performed 79% better than the control group. Although of primary interest to other researchers, this report should also be of direct interest to the Defense Language Institute and the training community. (Author)

AD-A086 882/8 PC **A04**/MF **A01**
Training Analysis and Evaluation Group (Navy) Orlando FL
Student Flow Simulation Model for Navy Consolidated Electronic Warfare Training,
Ted. E. Pearson, Chan S. Park, James H. Gardner, and Lysle R. MacKeraghan. May 80, 61p Rept no. TAEG-80

This report describes an applied training research study in the use of computer simulation being conducted for the Chief of Naval Education and Training (CNET) by the Training Analysis and Evaluation Group (TAEG). The study is a subelement of the Consolidated Navy Electronic Warfare School (CNEWS) training system program. The results of this applied research task should help improve the processes of planning, developing, and scheduling of training courses within CNEWS, including maintenance and operator training, officer and enlisted, common-core basic and advanced equipment-specific 'C' school level courses, as well as individualized (self-paced) and lock-step (group-paced) training. To achieve its purpose, TAEG was assisted by the University of Central Florida's Industrial Engineering and Management Systems Department who will develop the computer simulation model of EW student flow and CNEWS training resource/facility utilization during phase II of the study. When completed, the model will be used by the training command as a planning tool in support of further development and implementation of the CNEWS individualized training curriculum. (Author)

AD-A086 883/6 PC **A02**/MF **A01**
Training Analysis and Evaluation Group (Navy) Orlando FL
Operational Performance of P-3 Pilots as a Function of Variations in Fleet Readiness Training.
William C. McDaniel, Paul G. Scott, and Robert F. Browning. Jun 80, 24p Rept no. TAEG-87

This study examines the long-term effects of simulator training at the Fleet Readiness Squadron on subsequent performance in operational squadrons. It utilizes a different approach for evaluating the training effectiveness of a flight simulator. An in-depth examination was made on operational performance data suitable for measurement of training effectiveness. In addition, the advantages of simulator trained pilots over nonsimulator trained pilots are detailed. The major finding of the study indicates that students trained in Device 2F87F, Operational Flight Trainer, and with fewer P-3 inflight training hours, performed equally as well or better than those students trained only in the P-3 aircraft when subsequently assigned to fleet operational squadrons. The study recommends a system for tracking performance of pilots from initial selection for flight training to ultimate designation as a Patrol Plane Commander. (Author)

ED-176 761 Not available NTIS
Resource Sharing in Professional Education for Librarianship: An International Approach,
Edward R. Reid-Smith. Sep 77, 11p
Paper prepared for the 1977 IFLA/UNESCO Pre-Session Seminar on Resource Sharing of Libraries in Developing Countries, Antwerp(Belgium) August 30-September 4, 1977. For related documents, see IR 007 707-722.

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The development of professional education in librarianship is reviewed from the national pattern conforming to the general system in each country, through the unilateral (paternalistic) internationalism in librarianship due to colonialism and the emergence of a new professional nationalism, to the opportunities offered by the growth of such multilateral international bodies as UNESCO, COMLA, and IFLA. It is proposed that UNESCO/IFLA organize a scheme of international cooperation in education for librarianship in order to ensure wider utilization of resources. Teletuition, staff exchanges, and sharing of educational software are some methods suggested.

ED-176 807 Not available NTIS
Imperial Coll. of Science and Technology, London (England). Computer Centre.
Computers in Engineering Teaching,
N. J. Rushby. 1978, 29p
For a related document, see IR 007 784.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This bibliography cites 26 books, papers, and reports dealing with various uses of computers in engineering education; and describes several computer programs available for use in teaching aeronautical, chemical, civil, electrical and electronic, mechanical, and nuclear engineering. Each computer program entry is presented by name, author, description, subject, documents, comment, language, and contact source for obtaining the program.

ED-176 808 Not available NTIS
Navy Personnel Research and Development Center, San Diego, CA.
Predicting Student Performance in a Computer-Managed Course Using Measures of Cognitive Styles, Abilities and Aptitudes,
Pat-Anthony Federico, and David E. Landis. Aug 79, 33p NPRDC-TR-79-30
For related documents, see ED-160 872, ED-165 792, IR-007 583, IR-007 590, and IR-007 622.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Measures of cognitive styles, abilities, and aptitudes from a sample of 166 Basic Electricity and Electronics School graduates were analyzed to determine if they were predictive of student achievement and times to complete instructional modules. Objectives of the research were to (1) identify measures of cognitive characteristics that may be predictive of student achievement in the first of 11 modules of the BE/E School; (2) determine whether the predictor pattern changes across the rudimentary modules of BE/E school; and (3) propose procedures for adapting instruction to student cognitive characteristics so as to improve student achievement and reduce the time to complete the basic modules. Graduates were measured on 24 cognitive characteristics. Using these data as predictors and module test scores and times to complete the modules as criteria, 22 stepwise regression analysis and two canonical analyses were computed.

ED-178 049 Not available NTIS
Computer Literacy and Societal Impact of Computers: Education and Manpower,
John W. Hamblen. 4 Oct 78, 15p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The use of computers in education and general society is continually expanding, but the growing need for highly educated computer technologists will continue unless universities take major steps toward the reallocation of their resources in favor of the burgeoning computer science departments, and government and industry provide a significant increase in graduate fellowships and other types of graduated student support. Computer training in the high schools may soon become available to the extent that clerks are prepared to become effective transaction terminal and data entry operators. However, few high schools can or should provide sufficient training for entry-level personnel in the computer center for operators, programming, or systems analysis, which should be provided by postsecondary institutions.

ED-178 056 Not available NTIS
West Virginia State Dept. of Education, Charleston. Bureau of Planning, Research, and Evaluation.
Impact of ESEA Title IV-C Projects on Education in West Virginia. Fiscal Year 1977-78 Report,
Philip F. Thornton. Aug 78, 37p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report provides an overview of the impact that nine ESEA IV-C funded projects in West Virginia have had in relation to monies expended, individuals served, and continued support provided for them. These projects focused on skill development in grades K-12 and addressed three levels: basic, life, and enrichment skills. The instrument used in collecting data for this report is included.

ED-178 057 Not available NTIS
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
The Instructional Effectiveness of Three Levels of Graphics Displays for Computer-Assisted Instruction,
Martha V. Moore. Apr 79, 23p ARI-TP-359
Sponsored in part by Deputy Chief of Staff for Personnel (Army), Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This study compares the effectiveness of three types of computer graphics display for computer-assisted instruction in (1) low level (boxed alphanumerics and schematics), (2) medium level (line drawings), and (3) high level (line drawings plus animations). Three groups of 30 enlisted personnel at the Engineering School and the Defense Mapping School, Fort Belvoir, Virginia, studied a computer-assisted instructional lesson on the psychophysiology of audition. Upon lesson completion, retention of four knowledge categories addressed in the CAI lesson were tested. Groups did not differ in their performance on the final retention tests or in lesson completion time.

ED-178 059 Not available NTIS
Corporation for Public Broadcasting, Washington, DC.
A Listing of Education Series Broadcast by Public Television Licensees, 1978-79,
Howard K. Spergel. Jan 79, 150p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This listing, compiled through the Corporation for Public Broadcasting's Office of Educational Activities, indicates those educational television series broadcast during the 1978-79 television season. The lists are arranged by elementary/secondary series (including only those series carried by ten or more licensees) and post secondary series. The elementary/secondary section contains 137 series, each assigned to a specific curriculum area. The 266 post secondary series are grouped by three categories; those which would be used in credit courses , those used in non-credit courses, and those intended for in-service professional training. Each entry contains the following information: title, curriculum area, primary and secondary target audiences, number and length of programs, production date, black-and-white or color, primary and secondary production formats, producer, distributor, number of licensees broadcasting in 1978-79, and a series description. An analysis of the elementary/secondary series is included, indicating content areas, carriage, intended grade levels of the series, length, production mode and dates, producers and distributors.

ED-178 078 Not available NTIS
University Television in Northeastern California: A Partial Solution for the Future,
Charles F. Urbanowicz. 15 Oct 78, 24p
Paper presented at the meeting of the World Future Society: Education Section, Clear Lake City, TX, October 20-22, 1978.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The Instructional Television Fixed Service (ITFS) closed circuit delivery system, which became operational on the California State University (CSU), Chico campus in 1975, has offered 61 courses (up to 13 per semester) with up to 27 transmission hours per week to campus students and people at six surrounding Regional Learning Centers (RLC). CSU, Chico envisages the campus program as extending throughout Northeastern California to fill the pressing need for quality education in sparsely populated areas. Instructors conduct campus classes before an assembled body of students, and the course (including classroom interaction) is broadcast in black and white over the ITFS system. Discussions are taking place about the possibility and feasibility of certain CSU campuses utilizing the ITFS system, and also of broadcasting the programs via satellite into the Pacific ocean region. Included are geographical population service diagrams and a descriptive list of courses offered by the ITFS system.

ED-178 089 Not available NTIS
Texas Education Agency, Austin. Div. of Instructional Resources.
Development of District Learning Resources Centers.
1979, 33p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

These guidelines are intended for administrators, supervisors, and directors of district learning resource programs who are engaged in the development of comprehensive programs, including evaluation, funding, and staffing, for the provision of services at both the local campus and district levels. Functions and responsibilities, staff, facilities, and budget matters for district learning resource programs are discussed; and a matrix outlines the number and qualifications of district level staff needed by districts of varying sizes. The functions, staff, and facilities relationships are illustrated in a table; and two report forms for soliciting the types of information usually collected at inventory time are included. The profile chart provided can be used to portray visually both the existing and desired status of the district.

ED-178 093 Not available NTIS
McDonnell Douglas Astronautics Co. East, St. Louis, MO.
Orientation/Time Management Skill Training Lesson: Development and Evaluation.
Final rept.,
Jacqueline L. Dobrovolny. Jul 79, 118p AFHRL-TR-79-14
Contract MDA-903-77-0144
For a related document, see IR-007 838.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Supt. of Docs.

A lesson was developed containing materials designed to assist students in their adaption to the novelties of a computer assisted or managed instructional environment, providing students with appropriate role models for increasing acceptance of their increased responsibility for learning and introducting a progress tracking approach to assist students in achieving completion goals in a self-paced training environment. Formative evaluation data from small group and operational lesson implementation in the Air Force Advanced Instructional System (AIS) reveal a 9 to 18 percent reduction in course completion time, and suggest that substantial time savings can be obtained by a combination of this type of computer instruction orientation and time management skill training with a computer-based progress targeting and feedback system. Appendices include a copy of the lesson, student success guidelines, a course completion map, a material facilities time sheet, two lesson criterion test forms, and a glossary.

ED-178 095 Not available NTIS
Illinois Univ. at Urbana-Champaign. Dept. of Secondary Education.

MSEA--The Department's Microcomputer. The Illinois Series on Educational Applications of Computer,
Viktors Muiznieks. Dec 78, 31p
Report on Illinois Series on Educational Applications of Computers, Rept. no. ISEAC-27. For related documents, see IR-007 782, IR-007 796, and ED-142 199.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report provides a technical description and operating guidelines for the IMSAI 8080 microcomputer in the Department of Secondary Education at the University of Illinois. An overview of the microcomputer highlights the register array, address logic, arithmetic and logical unit, instruction register and control section, and the data bus buffer. The timing control, data bus, and interrupt control of the 8080 CPU are described, exercises to familiarize users are provided, and assembly language is discussed.

ED-178 098 Not available NTIS
Competency Based Assessment: An Update,
James E. McNamara. 1978, 26p
For a related document, see ED-149 740.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This literature review outlines the assessment activities for competency based education (CBE) in five different disciplines in higher education, and discusses two approaches to assessment in programs leading to degrees in library science and media. Assessment efforts in CBF programs relating to library science and media are emphasized in order to tie the findings of this review to the research efforts of Daniel and Ely (1978), which are directed toward filling the assessment gap within CBE programs for school media personnel. Two matrices for guiding evaluation strategy and test construction are described which may help overcome problems facing CBE assessment. Innovators are warned that the impact of CBE programs will be diminished if they fail to deal with problems of CBE assessment.

HRP-0028706/0 PC **A04**/MF **A01**
Southwest Georgia Health Systems Agency, Inc., Albany.
Southwest Georgia School Health Education Evaluation,
Sam E. James. Aug 78, 55p
Grant PHS-04-P-000215-02-0
Prepared in cooperation with Georgia Coll., Milledgeville.

Responses to a questionnaire sent to 204 public school principals and 34 private school headmasters in Southwest Georgia indicated that current health instruction is inadequate. Programs are almost always taught and planned by individuals who are not certified as health educators. Sex education, noncommunicable diseases, and family life education are largely ignored. Funds and quality textbooks are lacking, and the schools are frequently not in compliance with State requirements for health education. To remedy the situtation, the Southwest Georgia Health Systems Agency recommended that a public information campaign develop an awareness of the need for health education through parent/teacher associations, radio and television stations, and newspapers, and that a model program be developed in a rural and urban school system to show other schools how such a program might work. The program can then be extended to all other schools in the areas. Six reference sources are listed. An appendix shows the responses to the questionnaire; the responses are broken down by private, secondary, and elementary schools.

HRP-0030845/2 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
The Education and Training of Public Health Medical Officers.
1977, 38p ICP/HMD-037
Report on a Working Group, Held at Copenhagen (Denmark) on February 23-25, 1976.

The need for, and work patterns of public health medical officers in Europe were addressed at a working group convened by the World Health Organization. The working group focused on officers who administer health services at the municipal or regional level, rather than on top-level public health administrators. The factors determined to have a significant impact on society in general and on health and medical services in particular are progress in medical science and technology, changing disease patterns, changing demography, the growing awareness of the need to apply health economics, impact of modern civilization, and the growing health consciousness of individuals. Public health medical officers function in three typical health delivery systems: unified service; service in which preventive and curative functions are separate, with officers responsible only for environmental health, the control of communicable disease, the inspection of health and related establishments, and the registration of health personnel; and service where officers exercise some functions relevant to preventive health services by serving as medical advisers to social insurance and social welfare agencies, in addition to traditional tasks. Consideration is given to the recruitment of public health medical training programs and the role of research in training, senior staff training for leadership, educational policy and planning, and training institutions.

HRP-0901900/1 PC **A03**/MF **A01**
Association of Univ. Programs in Health Administration, Washington, DC.
Educational Program for EMS (Emergency Medical Services) Systems Administration and Planning. Module V - Decision Making and Management Science,
Efraim Turban. 1977, 29p
Contract PHS-HRA-231-75-0602
See also Instructor's Manual, HRP-0901877 and Sponsor's Guide, HRP-0901878.

An instructional module on decisionmaking and management science is presented as part of an educational program for emergency medical services (EMS) systems administration and planning. The program consists of 23 such modules, which can be adapted to a variety of educational needs and settings. The module focuses upon basic concepts of management decisionmaking, management science, operations research, and management engineering. The 4-hour instructional format involves lectures, case studies, role playing, and group discussion. Readings, assignments, and audiovisual presentations are noted, and a detailed course content outline is provided. The course content revolves around the major topics of decisionmaking and its increasing complexity, characteristics of management science, the role of information in decisionmaking, the application of management science tools to EMS. Also discussed are systems analysis, modeling, a systems view of EMS, decision matrices, modeling and solution of EMS problems, work simplification, and improvement of facility design. Two case studies are appended.

HRP-0901915/9 PC **A16**/MF **A01**
Harvard School of Public Health, Boston, MA.
Executive Programs in Health Policy and Management.
Final rept.,
Marc J. Roberts. 30 Jun 79, 357p
Contract N01-AH-4-4105

The development and testing of educational programs for executives and decisionmakers in the health care delivery system is described. The programs developed include management skills for professional nurses, health planning and regulation, health systems management, financial management and strategy, management development, environmental policy and management, multi-institutional collaboration, and programs for hospital trustees and chiefs of clinical services. These programs are intended for professionals in midcareer who have an influence on institutional policy. They were developed as a means of updating knowledge in response to the rapid pace of change in the health care delivery system. The programs are intensive, range in duration from three and one half days to six weeks and are conducted residentially with little spare time for the participants. Interactive teaching, interaction among participants, and a problem-solving orientation are among the features. Faculty, marketing, and administrative factors are described. The goal is to influence the professional behavior of the participants and cause them to reconsider their orientations. The characteristics of each program are discussed. A breakdown of the participants' professional affiliations and a list of new materials developed are provided. Appended is a sample administrative manual, including course outlines and schedules.

HRP-0902205/4 PC **A02**/MF **A01**
Center for Human Services, Washington, DC.
Pharmacy and the Elderly - Executive Summary,
Bunny Stalpes. Sep 79, 16p
Contract PHS-HRA-232-78-0176

In September 1978, the Bureau of Health Manpower, Health Resources Administration contracted with the Center for Human Services to identify the pharmaceutically related needs of the elderly and develop recommendations for increasing the geriatric aspects of the curriculum in schools of pharmacy. The initial phase consisted of an assessment of the needs of the elderly and corresponding professional functions of pharmacists to address those needs. The second phase consisted of an assessment of curriculum activities at selected pharmacy schools across the country vis-a-vis these needs of the elderly and a discussion of recommendations for increasing the geriatric aspects of pharmacy curriculum. Recommendations were developed in the areas of curriculum, resource development, and research to provide a framework for pharmacy educators to plan curricula that will better prepare pharmacists who serve the growing numbers of elderly.

HRP-0902207/0 PC **A07**/MF **A01**
Center for Human Services, Washington, DC.
Pharmacy and the Elderly - Final Report,
Bunny Staples. Sep 79, 126p
Contract PHS-HRA-232-78-0176

Because elderly people use a great many medications, and because the drugs they consume are generally among the most potent, there is an obvious potential for older people to have significant problems with drugs. The pharmaceutical revolution of the past 20 years; increasing medical specification, and the growing numbers of elderly people requiring and receiving health care combine to make it important that all health care providers learn more about health care needs of the elderly. The pharmacist is an important member of the health care team; he or she is in a position, and indeed has a responsibility, to address some of these needs.

PB80-199144 PC **A03**/MF **A01**
Wisconsin Survey Research Lab., Madison.
National Volunteer Firefighters Survey; a Report.
Final rept.,
Charles D. Palit. Apr 80, 32p
Sponsored in part by Fire Administration, Washington, DC.

The report presents a general profile of volunteer fire departments in the U.S. serving communities of 50,000 or less residents. Of approximately 849,000 volunteer firefighters attached to 18,000 volunteer fire departments located in these communities, about 500,000 are active firefighters, whose average age is 39. More than one-half of the active volunteers (54 percent) receive no wages. For those who do and are paid hourly, 1979 data indicates the median rate is $4.00 for the first hour, and $3.00 for subsequent hours of a fire. Almost all fire departments file a written report on every fire and make annual summaries, but only three of every 10 use the NFPA Standard 901 for fire reporting. Sixty percent of the departments make fire safety inspections on non-residential facilities; 40 percent make residential inspections. One-fourth of the volunteer fire departments receive some financial support from sources outside the communities they protect. A substantial portion of the support is State aid (received by 15 percent of the sampled departments) followed by Federal aid (received by 6 percent). Virtually none of the departments sampled is supported by private donations from outside the community. A majority of departments (93 percent) provide some training for their active volunteer firefighters, and more than four out of every five departments spend some time teaching fire safety to the public.

PB80-200694 PC A03/MF A01
Applied Management Sciences, Inc., Silver Spring, MD.
Evaluation of the Expanded Function Dental Auxiliary (EFDA) Training Program.
Executive summary Jun 76-Sep 79,
Douglas E. Skinner, Mary Beth Celio, Denise Thum, and Pauline R. Charpentier. Sep 79, 39p
G-86-ES, HRP-0902347
Contract PHS-HRA-231-76-0026
See also Final report, PB80-200702.

This report presents the findings of an evaluation survey of the Federally supported Expanded Function Dental Auxiliary (EFDA) training program. The report is structured around 16 research objectives designed to determine the extent to which graduates of EFDA training projects are utilized to perform expanded functions; ascertain the effectiveness of the EFDA Program in training dental auxiliaries to perform expanded dental functions; and characterize the attitudes of patients, dentist-employers, and other employed auxiliaries in private practices concerning the delegation of expanded functions to dental auxiliaries. Interpretive information obtained during and from the evaluation is also a part of the report, as well as a list of developed recommendations for the improvement and continuation of the EFDA training program. The survey established criteria and an evaluation method for assessing individual EFDA projects, and led to a definition of an EFDA that gives consideration to functions other than placing and finishing permanent restorations.

PB80-200702 PC A12/MF A01
Applied Management Sciences, Inc., Silver Spring, MD.
Evaluation of the Expanded Function Dental Auxiliary (EFDA) Training Program. Volume I. Study Findings.
Final rept.,
Douglas E. Skinner, Mary Beth Celio, Denise Thum, and Pauline R. Charpentier. Sep 79, 264p
G-86-F, HRP-0902348
Contract PHS-HRA-231-76-0026
See also Executive summary, PB80-200702.

The utilization of dental auxiliaries to perform expanded functions has been widely identified in the literature as a means of effecting an increase in the volume and mix of services provided by the dental delivery system, while assuring the quality of those services and, possibly, with production costs at the same or somewhat lower levels. Federal support of initiatives to encourage the effective utilization of auxiliary personnel has been continuous since the early 1960's, including the Dental Auxiliary Utilization (DAU) Program (1961-1972), the Dental Manpower Development Center research and training efforts in Louisville, Kentucky (1964-1976), and the Training in Expanded Auxiliary Management (TEAM) Program (1971-present).

PB80-200900 PC A09/MF A01
Columbia Univ., New York. Graduate School of Business.
Unemployment Duration and the Quality of Re-employment After Layoff as a Function of Individual Differences in Labor Market Behavior.
Final rept. Apr 78-May 80,
Mary Lynn Braswell. May 80, 196p DL-91-36-78-21-1
Grant DL-91-36-78-21
Doctoral thesis.

The principal research objective of this study was to identify those individual characteristics, incentive factors and behavioral differences which determine the length of unemployment after job loss. A path analytic model was developed to explain the duration of unemployment of 185 professional and technical employees laid off by the municipal and State governments. The duration of unemployment was modeled as a function of six interdependent variable groups: (1) individual characteristics and qualifications, (2) job aspirations - the specific job the worker most wanted to find, (3) financial incentives - the financial deprivation due to lost wages and the resulting incentive to seek and accept a job; (4) job serarch behavior - the degree of activity and breadth in searching for jobs, (5) job offers; and (6) decline in the asking wage - the difference in the wage accepted relative to the wage previously earned.

PB80-200926 PC A02/MF A01
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
A Design for Validating Selection Procedures for Groups of Jobs.
Professional paper,
Richard A. Lilienthal, and Theodore H. Rosen. Apr 80, 13p PP-80-4

The paper presents the rationale for procedures being used in a current Office of Personnel Management test validation project. The goal of the preliminary work was to design a methodology that would enable a large number of jobs to be validated in one study. Twenty-eight lower-entry-level technical jobs were identified as having enough similar work behaviors to be included in the same study. A molar definition of work behavior was developed so that jobs could be grouped together according to similar work behaviors. A work behavior inventory was chosen as the most appropriate job analysis technique for analyzing many jobs having large numbers of incumbents. A method of generalizing validity from a few criterion-related validation studies to a number of related jobs was developed. It allows generalizing from jobs for which criterion-related validation studies were conducted to other jobs to the extent that they share constructs and work behaviors.

PB80-201619 PC A02/MF A01
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Assessment Centers in Upward Mobility Programs,
Larry L. Lackey. May 80, 17p PRR-80-8

The guide was developed for the purpose of providing persons tasked with conducting an Upward Mobility Program with sufficient information to determine whether an assessment center should be one of the appraisal methods to be used in the program. Assessment centers, which involve the use of trained observers to evaluate the behaviors of Upward Mobility applicants in multiple, structured situations, can provide a unique input to the final rating of each applicant. However, assessment centers are not appropriate for every Upward Mobility Program. If an affirmative decision for the use of an assessment center is reached, several requirements for operation of the center, which are described here, should be reviewed. This guide was developed to provide information and not as a substitute for a resource person possessing the necessary expertise to develop and operate an assessment center.

PB80-201635 PC A03/MF A01
Office of Personnel Management, Washington, DC. Office of Labor-Management Relations.
Multi-Unit Agreements in the Federal Service.
Annual rept.
1 Jun 80, 41p OPM/OLMR-80/5
See also report dated 1 Jun 79, PB-299 519.

This publication contains listings of Federal recognition units which are covered by a negotiated agreement covering more than one such recognition unit. The data has been extracted from the Labor Agreement Information Retrieval System (LAIRS), an automated data file of all Federal service labor agreements maintained by the Office of Personnel Management. The recognitions included are listed by agency, and recognitions covered by the same agreement have the same multi-unit number within each agency. Also listed for each recognition is the CSC region in which it is located, the union and its local number, total number of employees covered by that recognition, and the expiration date and duration of the agreement.

PB80-201650 PC A04/MF A01
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Developing an Assessment Center in the Patent and Trademark Office Upward Mobility Program,
Larry L. Lackey. Jun 80, 62p PRR-80-13

The document describes the development of an assessment center which was used in an Upward Mobility Program by the Patent and Trademark Office, Department of Commerce. This assessment center model was developed by staff psychologists of the Personnel Research and Development Center, Office of Personnel Management. A job analysis was conducted on each of twelve target paraprogessional positions selected for the Upward Mobility Program. Based on the results of the job analysis, an assessment center model consisting of four assessment exercises was developed. A supervisory appraisal form and a supplemental evaluation form were constructed to evaluate the knowledges, skills, abilities, and other characteristics identified as important to job performance. Profiles on the most important knowledges, skills, abilities, and other characteristics for each position were developed. A total of 284 applicants were evaluated. Based on the applicant's overall evaluation score, the position applied for, and the applicants profile for that position, a register was developed for each position, consisting of the top five applicants, plus ties. After an interview with a selecting official, one of the top candidates was selected for each of the available positions. A recommendation for the selection of assessment center exercises was developed.

PB80-201734 PC A02/MF A01
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
The Probationary Period: Its Use in Selection and Performance Evaluation,
Stephen M. Cormier. May 80, 11p PRR-80-5

The probationary period offers one possible solution to the problem of developing a selection instrument that measures purely job-related skills. Since the new employee is necessarily performing some aspects of the job, this should enable the measurement of these abilities in the probationary period. Unfortunately practical considerations of time and cost among other things provide little hope that the probationary period can be used in this way. It is suggested that a better strategy would be to use the probationary period as a means of verifying the effectiveness of other alternate selection devices, in other words as a follow-up evaluation component. Some of the potential problems of employee evaluation in the probationary period are discussed. Following this, specific suggestions are made which should help improve the accuracy and usefulness of such evaluations.

PB80-201932 PC A02/MF A01
Mathtech, Inc., Bethesda, MD.
An Analysis of U.S. Sex Education Programs and Evaluation Methods. Executive Summary.
Research rept. 1978-79,
Douglas Kirby, Judith Alter, and Peter Scales. Jul 79, 24p HHS/CDC/BHE-80/0001, CDC-2021-79-DK-FR-ES
Contract PHS-CDC-200-78-0804

The report reviews the literature on sex education programs, identifies the important features and outcomes of programs, selects and summarizes excellent school and non-school programs, reviews previous methods of evaluating programs, and develops new methods of evaluating programs. This work is designed to improve both the teaching of sex education and the evaluation of that instruction.

PB80-201940 PC A08/MF A01
Mathtech, Inc., Bethesda, MD.
An Analysis of U.S. Sex Education Programs and Evaluation Methods. Volume I. An Analysis of U.S. Sex Education Programs.
Research rept. 1978-79,
Douglas Kirby, Judith Alter, and Peter Scales. Jul 79, 166p HHS/CDC/BHE-80/0002, CDC-2021-79-DK-FR-1
Contract PHS-CDC-200-78-0804
See also Volume II, PB80-201957.

Sex education begins with the child's first years in school. The children learn from the role model of the teacher and from the manner in which common sexual incidents are treated. Sex education with formalized curriculum is practically nonexistent in elementary schools. Elementary school sex education has rarely been studied and few specific programs have been evaluated. In junior high, students are more directly encountering the physiological, emotional, and social consequences

of puberty and adolescence. In a few schools, teachers focus on these changes, feelings, and problems. Educators have devoted much greater effort to developing sex education for high school students. High school programs have enormous diversity. An overview of school sex education programs, the effects of sex education programs based on a review of the literature, important features and outcomes of sex education programs, exemplary school programs, a review of nonschool programs, and an analysis of State guidelines for sex education instruction in public schools are covered.

PB80-201957 PC **A09**/MF **A01**
Mathtech, Inc., Bethesda, MD.
An Analysis of U.S. Sex Education Programs and Evaluation Methods. Volume II. An Analysis of Evaluation Methods.
Research rept. 1978-79,
Douglas Kirby, Judith Alter, and Peter Scales. Jul 79, 187p HHS/CDC/BHE-80/0003, CDC-2021-79-DK-FR-2
Contract PHS-CDC-200-78-0804
See also Volume IV, PB80-201965.

The volume focuses upon methods used to evaluate the effectiveness of different sex education programs. It also discusses the major issues of overall design as well as specific methods of collecting data.

PB80-201965 PC **A07**/MF **A01**
Mathtech, Inc., Bethesda, MD.
An Analysis of U.S. Sex Education Programs and Evaluation Methods. Volume IV. Bibliography.
Research rept. 1978-79,
Douglas Kirby, Judith Alter, and Peter Scales. Jul 79, 131p HHS/CDC/BHE-80-0005, CDC-2021-79-DK-FR-4
Contract PHS-CDC-200-78-0804
See also Volume V, PB80-201973.

The bibliography of sex education programs, evaluations of programs, sex education and the community, State guidelines, and programs in foreign countries is based on an extensive review of (1) the holdings of the Institute for Sex Research at the University of Indiana (Kinsey Institute) and (2) computerized searches of the following files -- comprehensive dissertation abstracts; CRISP (Computer Retrieval of Information on Scientific Projects); ERIC (Education Resource Information Center); Foundation Grants Index; MEDLARS (Medical Library Automated Retrieval System); NCMHI (National Clearinghouse for Mental Health Information); NTIS (National Technical Information Service); Office of Child Development Retrieval Program at Georgetown University, Psychological Abstracts, SOCIAL SCISEARCH; Sociological Abstracts. Approximately 4000 journals in which material might be presented were covered in the computerized searches. The bibliography focuses upon sex education and not upon adolescent sexuality.

PB80-201973 PC **A04**/MF **A01**
Mathtech, Inc., Bethesda, MD.
An Analysis of U.S. Sex Education Programs and Evaluation Methods. Volume V. Annotated Bibliography of Selected Curricular Materials.
Research rept. 1978-79,
Douglas Kirby, Judith Alter, and Peter Scales. Jul 79, 56p HHS/CDC/BHE-80/0006, CDC-2021-79-DK-FR-5
Contract PHS-CDC-200-78-0804
See also Executive Summary, PB80-201932.

The annotated bibliography of curricular materials was created by Michael J. Schaffer under the auspices of the Sex Education Coalition of Metropolitan Washington, Inc., and with access to the materials of the Prince George's County (MD) Public Schools. To produce the bibliography, first, Schaffer reviewed all materials in the Prince George's collection - one of the most comprehensive in the nation. Second, members of the Coalition discussed an initial bibliography making additions. Third, recommendations from prominent sex education organizations were reviewed and included. Curricular materials are categorized as print, non-print, and films for elementary, junior high, and senior high school age students.

PB80-202146 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign.
The Determinants and Consequences of Obtaining Unionized Employment,
Francine D. Blau, and Lawrence M. Kahn. Jun 80, 43p DLETA-91-17-79-31-1
Contract DL-91-17-79-31

The report examines the union impact on job search. Using the National Longitudinal Surveys of young men and young women, the study finds that other things equal, the probability that a job changer obtains a union rather than a nonunion job is negatively associated with the number of weeks of unemployed search between jobs. This finding is consistent with a systematic search model: searchers have prior information about the firms being sampled; to maximize expected wealth, job seekers contact high wage (union) firms before low wage (nonunion) firms. An inverse relationship between search time and unionism results. This finding further implies that existing estimates of union-nonunion wage differentials underestimate the total union effect when search time is taken into account. The difference in expected wage offers for union and nonunion jobs confronting searchers is found to be 24.9%.

PB80-202211 PC **A03**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Demographic Characteristics of the Incumbents of PACE Occupations,
Ronald Karren. Aug 79, 27p TM-79-11

The number of full-time Federal employees by sex, race, and ethnic origin was determined for all PACE occupations (about 118). Since approximately 85% of PACE applicants have college degrees, the appropriate labor market is the nation's college graduates. Data were accumulated for primary occupations, where all GS-5 and GS-7 positions were filled through PACE; and also for the remaining 12 occupations in which only some positions were filled through PACE. For all comparisons, the percentage of minorities in PACE occupations was higher than the percentage in the relevant labor market. The percentage of women in PACE occupations was lower than in the relevant labor market, and the difference was statistically significant. Analysis of trends indicated the prospect of improvement in numbers of minorities and women in PACE occupations in the future.

PB80-202401 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
The Use of Reference Checks for Selection,
Richard A. Lilienthal. May 80, 16p PRR-80-12

The paper examines the use of reference checks as a selection method. It tries to present an objective review of the method rather than to make specific recommendations. Two possible uses for reference checks are identified: to verify information supplied by the applicant, and to obtain evaluations of the applicant's past educational or work performance for use in predicting job performance. The advantages and disadvantages of different methods of conducting reference checks are presented. Included in this are various methods of contacting people (in writing, by telephone, and in person) and of structuring the request for information (from the open-ended request to the forced-choice questionnaire). Data is presented on the question of who and how many people to contact, as well as on the related topic of how to reduce the tendency of people to give overly positive information. The type of information typically requested is given, as is information on what questions should and should not be asked. The topics of reliability, validity, and adverse impact are covered.

PB80-202583 PC **A14**/MF **A01**
Office of Personnel Management, Washington, DC. Office of Labor-Management Relations.
Index of Federal Labor Relations Cases.
Mar 80, 325p OPM/OLMR-80-2
See also report dated Oct 79, PB80-131873.

The issue updates the October 1979 Index of Federal Labor Relations Cases to March 1, 1980. It contains case determinations of the Federal Services Impasses Panel, Federal Labor Relations Authority, Federal Employees Appeals Authority, Comptroller General, Federal Labor Relations Council, and the Assistant Secretary for Labor-Management Relations.

PB80-202724 PC **A04**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Final Report on the Interim Selection Procedures for Members of Boards of Contract Appeals,
Amiel T. Sharon. Mar 80, 58p PRR-80-3

The report describes the development of interim selection procedures for Administrative Judge (member of board of contract appeals). These procedures, which were developed in May, 1979, have been refined and improved following their initial administration by the Armed Services Board of Contract Appeals during the summer of 1979. The selection procedures developed in the project were designed to be job-related, content-valid, and consistent with the interim use requirements of the Uniform Guidelines on Employee Selection Procedures. A job analysis was conducted by administering a task inventory to Administrative Judges at three agencies and the results used to identify the critical work behaviors. Fourteen knowledges and abilities required for the job were identified and linked to each of the important work behaviors. An examination plan was prepared to specify how each of the required knowledges and abilities is to be assessed. The selection procedures developed consist of (1) analysis of legal experience, (2) reference checks, (3) evaluation of applicants' writing samples, and (4) a panel interview.

PB80-203003 PC **A06**/MF **A01**
Temple Univ., Philadelphia, PA. Dept. of Economics.
Determinants of Successful Reentry of Mature Women into the Labor Force.
Final rept..
Eileen Appelbaum. May 80, 125p DLETA-21-42-78-51-1
Grant DL-21-42-78-51

The choice between a lengthy withdrawal and a more continuous pattern of labor force participation has important consequences subsequently. The 1972 wages of women following the first pattern were lower than those of women following the second; and this gap widened between 1972 and 1976. In 1972, nearly all of the gap was due to differences in productivity characteristics; but by 1976 this was no longer the case. Job satisfaction of women following the first pattern is affected by family responsibilities and husband's attitude. For women following the second pattern, it is related to the rewards from work and not to pressures from home. All post-school investments examined affect the successful reentry of women following the first pattern, as do characteristics of jobs held early in the career. Finally, it was found that working part-time after reentering has serious negative consequences for women returning after a lengthy withdrawal.

PB80-203011 PC **A02**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Training Material Development for the DART (Data Analysis and Reporting Techniques) System.
Final rept. Sep 78-May 80,
Arlene M. Cleven. May 80, 18p ED-80-8, DOT-HS-805-444
Contract DOT-HS-8-02058

The purpose of the study was to develop, pilot test, and document a training program for the DART (Data Analysis and Reporting Techniques) system. DART is a computer system designed to aid states in identifying their own highway safety problems through analysis of their own accident data. The resultant training program consists of 15 units of instruction and requires 4-1/2 days of training time. The course emphasizes the practical aspects of working with the DART system tools. Approximately one-half of total training time is devoted to trainee practice. The training package consists of an Instructor Manual prepared to assist the instructor in the day-to-day conduct of each course lesson, a Trainee Manual prepared to serve as a

resource document for individuals attending the DART training course, and a set of 50 illustrations (transparencies to be used with the overhead projector) prepared to assist instructor and trainee in achieving lesson and course objectives.

PB80-203573 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
An Investigation of Reference Ratings of Applicants for Administrative Law Judge,
Amiel T. Sharon. May 80, 25p PRR-80-6

The purpose of this study was to analyze the reference ratings of applicants for administrative law judge to determine the reliability and other psychometric properties of the ratings and their relationship to certain rater characteristics. The analysis was conducted on the ratings made by 883 raters of 58 applicants. Each applicant was rated on 27 different abilities and traits. The results indicated that the applicants were rated very favorably, almost all of them were evaluated as better than average or outstanding. Despite the small discriminations of the total ratings among applicants, the average interrater reliability was estimated to be .75. A mathematical averaging of all the ratings obtained by each applicant yielded approximately the same overall evaluation of applicants as a subjective averaging of the ratings by personnel examiners. Overall evaluations of applicants based on certain subgroups of raters did not agree well with overall evaluations made by personnel examiners. The nature of the relationship and the frequency of contact between rater and applicant determined, to some degree, how favorably the applicant was rated.

PB80-203607 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Suggestions for Structuring and Conducting the Selection Interview.
Professional paper,
Anthony J. Mento. Apr 80, 25p PP-80-1

The report is intended to provide explication of issues in employment interviewing. Relevant court decisions directly related to the use of the interview is provided.

PB80-203813 PC **A03**/MF **A01**
Institute for Public Program Analysis, St. Louis, MO.
Design of Duty Schedules for Fire Service Personnel: Executive Summary,
Nelson B. Heller, William W. Stenzel, Allen D. Gill, and Richard A. Kolde. cMar 79, 29p NSF/RA-790402
Grant NSF-APR75-22818
See also PB80-203821.

An overview is presented of the two companion volumes produced by the project: Design of Duty Schedules for Fire Service Personnel: A Guide to Scheduling Practices, and Design of Duty Schedules for Fire Service Personnel: Schedule Design Handbook. The Guide and Handbook are intended as reference tools for individuals who must either analyze proposed duty schedules or design schedules with pre-specified attributes. All three reports are based on a survey of literature dealing with fire duty schedules and related topics; contact with fire professionals, operations researchers, and major public and private organizations connected with the fire service; personal visits to eleven fire departments; contact by letter or telephone with eight additional fire departments; and consultation with a project advisory board which included, among others, representatives of the International Association of Fire Fighters, the International Association of Fire Chiefs, the International City Management Association, and the National Fire Protection Association.

PB80-203821 PC **A09**/MF **A01**
Institute for Public Program Analysis, St. Louis, MO.
Design of Duty Schedules for Fire Service Personnel: A Guide to Scheduling Practices,
Nelson B. Heller, William W. Stenzel, Allen D. Gill, and Richard A. Kolde. cMar 79, 196p NSF/RA-790403
Grant NSF-APR75-22828
See also PB80-203813.

Intended as a reference tool for individuals who either analyze proposed duty schedules or design schedules with pre-specified attributes, this guide explains the concepts, techniques, and issues involved in scheduling the duty hours of fire service personnel. The following topics comprise the bulk of the report: (1) staffing and deployment methods; (2) elements and administration of duty schedules for fire suppression and non-suppression personnel; (3) organizations influencing fire duty scheduling; (4) legal and political constraints on fire duty scheduling; and (5) an overview of the schedule design process. Appendices include a glossary of fire scheduling and deployment terms, a list of state laws affecting fire duty scheduling, samples of common fire duty schedules, and discussions of other scheduling-related issues.

PB80-204126 PC **A99**/MF **A01**
Westat, Inc., Rockville, MD. Research Div.
Data Collection Forms and Manuals Used with January-June 1975 CETA Enrollees (CLMS-1 (Continuous Longitudinal Manpower Survey) Public Use Tape).
Final rept. Jan-Jun 75.
Jul 80, 655p DOL/DF-80/001A, MEL-80-X-9
Contract DL-23-24-25-07
For system on magnetic tape, see PB80-204118.
See also PB80-204134.

The Data Collection Forms and Manuals are part of the documentation sent to purchasers of the CLMS-1 public use tape file. These are copies of the actual survey forms and interviewers manuals used in the sequence of interviews with January-June 1975 sample CETA enrollees. The CLMS-1 tape file contains approximately 7500 individual records on persons enrolled in CETA programs between January and June 1975. The data file contains microdata on sampled individuals from three sources: prime sponsor records, a series of up to four interviews with sampled enrollees, and social security earnings records (1951-1977).

PB80-206022 PC **A13**/MF **A01**
Florence Heller Graduate School for Advanced Studies in Social Welfare, Waltham, MA.
Private Pension Policy Simulations.
Final rept.,
Allan Borowski, William Spector, Leslie C. Kelly, and Thomas D. Leavitt. Jan 80, 300p
Sponsored in part by Department of Labor, Washington, DC.

The study was designed to investigate the future impact of private pensions on the economic status of the elderly. The study took account of and permitted analysis of the wide range of pensions received by different people in the same and also different pension plans. In the study, analysis was focused on these subjects: (1) projections of private pension income and private pension replacement rates, (2) the adequacy of private pensions when combined with projected social security income, (3) contrasts between persons with 'dual pensions' and those with only social security, (4) the role private pensions play in providing support for widows, and (5) pensions gained and lost under current and alternative vesting provisions.

PB80-206071 PC **A02**/MF **A01**
Texas A and M Univ., College Station.
Vocational-Technical Marine Career Opportunities in Texas,
Dewayne Hollin. Mar 80, 25p TAMU-SG-80-402, NOAA-80032123

The publication is to assist high school counselors, teachers and students in better understanding the career opportunities available in the Texas marine industry. It provides background information and descriptions of jobs in various Texas marine industries, as well as information about the training needed to enter particular positions. The main focus is on vocational-technical training for immediate entry into the marine industry. Some job opportunities discussed in this publication may require a college degree, but most require a high school diploma and some technical or on-the-job training within the marine industry.

PB80-206253 PC **A12**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Management of Housing for Handicapped and Disabled Persons. Instructor's Guide.
Feb 79, 261p HUD-PDR-537-6, HUD-0001309
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206261.

The instructor's guide on management of housing for handicapped and disabled persons is 1 of 18 developed by HUD to upgrade management skills in HUD-related housing. It reprints all the material in the participant's workbook and gives more detailed information, where necessary. It also answers the test questions.

PB80-206261 PC **A07**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Management of Housing for Handicapped and Disabled Persons. Participant's Workbook.
Feb 79, 150p HUD-PDR-537-24, HUD-0001310
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206253.

The participant's workbook accompanies one of a series of 18 developed for HUD housing management workshops; it concentrates on housing management for handicapped and disabled persons. The purpose of this workshop is two-fold: (1) to provide advanced students of housing management and inexperienced housing managers with an understanding of the special needs of disabled and handicapped persons and their relationships with the broader community in which they live and (2) to consider how these factors affect the role of the manager of specialized housing facilities. Special attention is directed to the unique responsibilities of the housing manager against the background of the historical responses of society to the disabled. Also focused on are the characteristics of the major causes of disability, the prevalence of disability in the U.S., the psychosocial and architectural barriers which limit accessibility to the community (including personal attitudes), the concepts of normalization and independent living, and the current legislation and programs affecting the disabled. The basic managerial tasks associated with the occupancy cycle, security, and resident relations are reexamined in the context of specialized housing. Finally, the development of skills in coordinating service networks and helping residents to help themselves is emphasized. Resources for each subject area are provided and an appendix supplies a self-evaluation test. An instructor's guide is also available.

PB80-206279 PC **A05**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Building Exterior and Interior Maintenance and Maintenance of Equipment and Lighting. Instructor's Guide.
Feb 79, 87p HUD-PDR-537-31, HUD-0001341
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206287.

The instructor's guide on building exterior and interior maintenance and maintenance of equipment and lighting is 1 of 18 in a housing management curriculum developed by HUD to upgrade management skills. It reprints all the material in the participant's workbook, but gives more detailed information and answers the test questions.

PB80-206287 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Building Exterior and Interior Maintenance and Maintenance of Equipment and Lighting. Participant's Workbook.
Feb 79, 63p HUD-PDR-537-26, HUD-0001342
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206279.

The workbook on apartment building maintenance, exterior and interior, and on maintenance of equipment and lighting was designed to upgrade management skills in HUD-related housing. Many of the principles presented should also be viewed by students and instructors as applicable to multifamily housing management practices in the private sector. Housing managers should be aware of the essential elements of interior maintenance (upkeep of ceilings, walls, floors, carpets, drapes, and stairs) and exterior maintenance (upkeep of the roof, gutters and downspouts, windows, the ex-

terior finish, and parking lots). This workbook familiarizes managers with these elements, as well as with ways they can maintain electrical and mechanical equipment. It also addresses elements of lighting management and maintenance. Elevator and escalator maintenance and electric heating maintenance are also discussed. Maintenance of lighting in offices, storage and janitorial areas, residences, and outside areas are described. A posttest and a skill test are included.

PB80-206295 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Litigation, Regulations, and Guidelines in Housing Management. Instructor's Guide.
Feb 79, 71p HUD-PDR-537-13, HUD-0001321
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206303.

The instructor's guide accompanies the workbook on litigation, regulations, and guidelines in housing management. It reprints all the material in the participant's workbook, but presents more detailed information, where necessary, and answers the test questions.

PB80-206303 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Litigation, Regulations and Guidelines in Housing Management. Participant's Workbook.
Feb 79, 54p HUD-PDR-537-4, HUD-0001322
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206295.

The workbook on litigation, regulations, and guidelines in housing management was designed by HUD for the housing manager in an effort to upgrade management skills in HUD-related housing. Many of the principles presented should be viewed by students and instructors as applicable to multifamily housing management practices in the private sector. The goals of the workbook are to enable managers to comply with responsibilities resulting from relevant court decisions, with relevant local laws and regulations, and with relevant Federal legislation and guidelines. It emphasizes practical knowledge acquired from the workbook that managers can apply to real problems and situations. Examples are presented of court decisions concerning rent determinations, admissions, evictions, and security. The workbook also discusses the four key elements in housing codes--coverage, minimum standards, responsibilities of management/residents, and enforcement--and examines rent control, planning and zoning, and urban renewal. Discussion also focuses on the legislative decisions affecting managers in the areas of income definition, project maintenance, terms of the lease, and evictions and grievances. The workbook describes HUD guidelines for owners and managers of section 202 elderly developments. A posttest and a skill test are included. The appendix presents a model lease form.

PB80-206311 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Energy Management for Housing Managers. Instructor's Guide.
Feb 79, 41p HUD-PDR-537-30, HUD-0001311
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206329.

The instructor's guide on energy management for housing managers is 1 of 18 developed by HUD to upgrade management skills in HUD-related housing. It reprints all the material in the participant's workbook and gives more detailed information, where necessary. It also answers the test questions.

PB80-206329 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Energy Management for Housing Managers. Participant's Workbook.
Feb 79, 31p HUD-PDR-537-15, HUD-0001312
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206311.

The workbook on energy management for housing managers is 1 of 18 developed by HUD to upgrade management skills in HUD-related housing. Many of the principles presented should also be viewed by students and instructors as applicable to multifamily housing management practices in the private sector. The workbook is designed to prepare housing managers to conserve the energy consumed in a housing development and to equip them to encourage residents' compliance with easy and commonsense methods of home conservation of fuels, water, and electricity. It discusses energy management principles concerning drapes; windows and doors; attics, ceilings, and walls; refrigerators; ranges; washers and dryers; dishwashers; disposals and compactors; televisions and radios; and heating and cooling. Among the many nontechnical measures discussed are opening drapes to use the sun for heat when heat is desirable and keeping them closed at other times; running appliances and thermostats on the lowest settings possible to get the job done; and avoiding loss of heat or cold by restricting opening of doors to the house, refrigerator, and oven when in operation. As such the workbook emphasizes practical knowledge that can be applied to real problems and situations. It contains a posttest and a skill test. One bibliographic citation is provided.

PB80-206337 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Resident Participation in the Housing Management Process. Instructor's Guide.
Feb 79, 70p HUD-PDR-537-36, HUD-0001333
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206345.

The instructor's guide accompanies the workbook on resident participation in the housing management process. It reprints all the material in the participant's workbook but gives more detailed information, where necessary, and answers the test questions.

PB80-206345 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Resident Participation in the Housing Management Process. Participant's Workbook.
Feb 79, 52p HUD-PDR-537-10, HUD-0001334
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206337.

The workbook on resident participation in the housing management process is 1 of 18 in a housing management curriculum developed by HUD for housing managers. It has been designed to upgrade management skills in HUD-related housing. Many of the principles presented should also be viewed by students and instructors as applicable to multifamily housing management practices in the private sector. The workbook familiarizes managers with the various types of resident participation, with appropriate goals for such participation, and with specific strategies for increasing the impact of residents in making decisions and developing policies for their communities. Common areas of resident participation through a resident council are monitoring the cleanliness and safety of public areas, having a voice in setting housing policy, and reacting to rent increases and other management moves affecting tenants. The workbook reviews the rights and responsibilities of managers and of residents of federally assisted housing to place management/resident relations in a professional and balanced perspective. It reviews the historical development of resident participation, the benefits of resident participation in the management process, the role of resident organizations, and the role of management in resident organization. The workbook emphasizes practical skills that can be applied to real problems and situations. A posttest and a skill test are included.

PB80-206352 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Budgeting Procedures for Housing Managers. Instructor's Guide.
Feb 79, 36p HUD-PDR-537-37, HUD-0001335
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206360.

The instructor's guide accompanies the workbook on budgeting procedures for housing managers. It reprints all the material in the participant's workbook but gives more detailed information, where necessary, and answers the test questions.

PB80-206360 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Budgeting Procedures for Housing Managers. Participant's Workbook.
Feb 79, 31p HUD-PDR-537-17, HUD-0001336
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206352.

The workbook on budgeting procedures for housing managers was developed by HUD to upgrade management skills in HUD-related housing. Many of the principles presented should be applicable to multifamily housing management practices in the private sector. The overall goal of the workshop is to enable managers to implement a comprehensive budgeting system. The workbook defines the budget as a plan expressed in quantitative terms whose end product is improved planning and coordination and more effective organizational control. Furthermore the budget is useful as a communications device that can motivate managerial staff at all levels; at the end of the fiscal year, it functions as an evaluation standard. The workbook discusses types of budgets (operating budgets, cash budgets, and capital expenditure budgets) and how to use a budget. Sample forms include the manager's monthly budget, the annual budget request, the annual budget summary, and the manpower budget. The workbook also describes budget projections and ratio analyses. Typical ratios (vacancy rate, current ratio, resident turnover ratio, expense ratio) and what they attempt to reflect are presented. A posttest, skill test, and a bibliography are included.

PB80-206378 PC **A06**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Characteristics of the Elderly. Instructor's Guide.
Feb 79, 110p HUD-PDR-537-23, HUD-0001337
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206386.

The instructor's guide accompanies the workbook on characteristics of the elderly for housing managers. It reprints all the material in the participant's workbook but gives more detailed information, where necessary, and answers the test questions.

PB80-206386 PC **A05**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Characteristics of the Elderly. Participant's Workshop.
Feb 79, 83p HUD-PDR-537-33, HUD-0001338
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206378.

The workbook complements a workshop for housing managers on the special needs of elderly residents as part of an 18-workshop housing management curriculum designed by HUD. The workshop focuses on the psychological, physical, social, and economic characteristics of the elderly which distinguish them from other residents. For meeting the needs of older residents, the workbook discusses needs assessment, mobilizing community resources, developing program strategies, evaluating services, and obtaining funds for social services. Definitions of the chief characteristics of the elderly, society's response to them, and new trends in public opinion about aging are provided for housing managers. Specific aspects of the elderly that are described include physical, sensory, and biological changes; chronic illness; sexuality; mobility; mental illness; organic brain disorders; functional or nonorganic disorders; depression; paranoia; special problems of elderly women; role and status; self-esteem; poverty; and economic supports. Responsibilities for managers regarding each of these aspects are delineated. A self-evaluation test is provided. An instructor's guide is available.

PB80-206394 PC **A06**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
The Manager and Social Service. Instructor's Guide.
Feb 79, 102p HUD-PDR-537-2, HUD-0001327

Grant HUD-H-2225G
See also Participant's Workbook, PB80-206402.

The instructor's guide on the manager and social service is 1 of 18 in a housing management curriculum developed by HUD to upgrade management skills in HUD-related housing. It reprints all of the material in the participant's workbook and gives more detailed information, where necessary. It also answers the test questions.

PB80-206402 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
The Manager and Social Service. Participant's Workbook.
Feb 79, 75p HUD-PDR-537-1, HUD-0001328
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206394.

The workbook addresses the range of social, economic, and psychological problems of public housing residents that a manager needs to be familiar with. It aims to help the housing management professional determine the service needs within a development and locate and effectively utilize community resources to meet such needs. It teaches development of program strategies for covering areas not met by outside resources, evaluation of effectiveness of service programs, fund-raising for service programs, and supervision of social service workers. Information is presented examining demographic variables compiling information about service agencies, building working relationships with agencies, and developing strategies. Services evaluation methodology is presented that addresses effort, performance, adequacy, efficiency, and process. Instructional aids amplify the workbook objectives with incentives for practicing the theories presented. In addition, an outline leads the participant through funding proposals, and pointers describe optimal supervisory characteristics for working with social workers. A posttest and a skills test are included. An instructor's guide is available also.

PB80-206410 PC **A06**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Personnel Administration in Housing Management. Instructor's Guide.
Feb 79, 110p HUD-PDR-537-35, HUD-0001319
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206428.

The instructor's guide on personnel administration in housing management is 1 of 18 in a housing management curriculum developed by HUD to upgrade management skills in HUD-related housing. It reprints all of the material in the participant's workbook and gives more detailed information, where necessary. It also answers the test questions.

PB80-206428 PC **A05**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Personnel Administration in Housing Management. Participant's Workbook.
Feb 79, 77p HUD-PDR-537-27, HUD-0001320
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206410.

The workbook's five objectives are to familiarize the student with (1) personnel planning and policy, (2) personnel recruitment and selection, (3) personnel training, (4) preferred methods of assigning and scheduling work, and (5) preferred methods of handling performance evaluations and other personnel actions. For instance charts provide information on the principal laws that affect the development of personnel policies in housing authorities, pointers are given on what kind of information to ask for from job applicants and on where to recruit personnel, and priorities management is described with regard to planning work assignments. Each of the goal areas has a learning objective and anticipated practice outcomes (those practical skills the professional is expected to implement on the job using information acquired in the workshop). The workshop that uses the learning objectives and anticipated practice outcomes of the workbook is expected to require two half-day sessions. A posttest and a skill test are included, together with a bibliography. An instructor's text is also available.

PB80-206436 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Marketing Procedures for Housing Managers. Instructor's Guide.
Feb 79, 60p HUD-PDR-537-29, HUD-0001331
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206444.

The instructor's guide accompanies the workbook on marketing procedures for housing managers. It reprints all the material in the participant's workbook but gives more detailed information, where necessary, and provides answers to the test questions.

PB80-206444 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Marketing Procedures for Housing Managers. Participant's Workbook.
Feb 79, 44p HUD-PDR-537-32, HUD-0001332
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206436.

The workbook on marketing procedures for housing managers is 1 of 18 in a housing management workshop curriculum developed by HUD to upgrade management skills in HUD-related housing. Many of the principles presented should also be viewed by students and instructors as applicable to multifamily housing management practices in the private sector. The overall goal of the workbook is to enable managers to implement a comprehensive marketing system. Four goal areas are presented: (1) identifying sources of prospects and marketing methods, (2) evaluating marketing methods, (3) defining and testing for discrimination, and (4) improving appearance of grounds and building, attitude of personnel, and specific rental techniques. Descriptions of different marketing methods are provided, together with the advantages and disadvantages of each. A posttest, skill test, and a bibliography are included.

PB80-206451 PC **A05**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Maintenance Management and Service Contracts for Housing Managers. Instructor's Guide.
Feb 79, 87p HUD-PDR-537-12, HUD-0001323
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206469.

The instructor's guide accompanies the workbook on maintenance management and service contracts for housing managers. It reprints all the material in the participant's workbook, but it gives more detailed information, where necessary, and answers the test questions.

PB80-206469 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Maintenance Management and Service Contracts for Housing Manager. Participant's Workbook.
Feb 79, 65p HUD-PDR-537-3, HUD-0001324
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206451.

The workbook on maintenance management and service contracts for housing managers is 1 of 18 in a housing management curriculum developed by HUD to upgrade management skills in HUD-related housing. Many of the principles presented should also be viewed by students and instructors as applicable to multifamily housing management practices in the private sector. It familiarizes the manager with methods for establishing specific time guidelines for performing routine and preventive maintenance, strategies for ensuring the proper staffing of qualified personnel to perform needed tasks, and techniques for determining cost factors and differentials necessary to accomplish various maintenance tasks. Techniques for determining work performance include work sampling, job slotting, and a standard data technique. The workbook also acquaints the manager with the appropriate situations for utilizing the services of a contractor, the methods for locating a contractor and for binding an agreement, and the pros and cons of using contracting services. It emphasizes the practical skills obtained from the information in the workbook that can be implemented on the job. Posttests, skill tests, and a bibliography are included.

PB80-206477 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Social and Economic Characteristics of Residents of Public Housing. Instructor's Guide.
Feb 79, 54p HUD-PDR-537-28, HUD-0001329
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206485.

The instructor's guide accompanies the workbook for housing managers on social and economic characteristics of residents of public housing. It reprints all the material in the participant's workbook but gives more detailed information, where necessary, and answers the test questions.

PB80-206485 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Social and Economic Characteristics of Residents of Public Housing. Participant's Workbook.
Feb 79, 35p HUD-PDR-537-8, HUD-0001330
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206477.

The workbook for housing managers on social and economic characteristics of residents of public housing is 1 of 18 in a housing management curriculum developed by HUD to upgrade management skills in HUD-related housing. The workbook has three major goals: to acquaint managers with legislation which has affected the residential composition of public housing, to provide a theoretical background on poverty and its implications, and to acquaint managers with the social and economic characteristics of the disadvantaged poor. The workbook discusses social legislation, financial policies and real estate legislation, a definition of poverty, theories concerning poverty, and characteristics of poor families. A posttest, attitude assessment, and bibliography are included.

PB80-206493 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Leasing Procedures for Housing Managers. Instructor's Guide.
Feb 79, 70p HUD-PDR-537-11, HUD-0001325
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206501.

The instructor's guide accompanies the workbook on leasing procedures for housing managers. It reprints all of the material in the participant's workbook, but gives more detailed information, where necessary, and answers the questions to the posttest and skill test.

PB80-206501 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Leasing Procedures for Housing Managers. Participant's Workbook.
Feb 79, 54p HUD-PDR-537-16, HUD-0001326
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206493.

The workbook attempts to prepare the housing manager to be able to carry out the stipulations set forth in contractual lease agreements. It has three overall goals: to enable the manager to interpret the content of a lease to residents, to assist the manager in implementing the rights and responsibilities expressed in a lease, and to enable the manager to enforce the responsibilities expressed in a lease. Some specific study topics include lease provisions (names of parties, amount and due date of rent, security deposit, etc.); lease terminology; management responsibilities regarding rent, security deposit, etc.); lease terminology; management responsibilities regarding such areas as common grounds maintenance, unit inspection, repair, and lease termination notification; and resident responsibilities concerning rent payment, use and subletting of property, and disruptive noise and behavior. Enforcement of lease provisions through eviction and notice of housing code violations and housing rule infractions (management) and grievance procedures and reporting housing

regulation and code violations (resident) is covered. Under each goal are statements about the specific knowledge participants are expected to acquire in the workshop and those practical skills managers need to implement on the job. A posttest and skill test are included.

PB80-206519 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Supervisory Skills for Housing Managers. Instructor's Guide.
Feb 79, 74p HUD-PDR-537-19, HUD-0001317
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206527.

The instructor's guide on supervisory skills for housing managers is 1 of 18 in a housing management curriculum developed by HUD to upgrade management skills in HUD-related housing. It reprints all of the material in the participant's workbook and gives more detailed information, where necessary. It also answers the test questions.

PB80-206527 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Supervisory Skills for Housing Managers. Participant's Workbook.
Feb 79, 34p HUD-PDR-537-9, HUD-0001318
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206519.

The workbook on supervisory skills for housing managers is 1 of 18 in a housing management curriculum developed by HUD to upgrade management skills in HUD-related housing. Many of the principles presented should also be viewed by students and instructors as applicable to multifamily housing management practices in the private sector. The workbook is designed to improve managers' supervisory and leadership skills and to increase their understanding of the motivation of individuals in organizations. It discusses elements of good leadership, skills relating to effective supervision, and theories of the motivation of individuals in organizations. Effective leaders must first communicate to others a sense of direction or purpose for their actions, motivate their followers, and exercise authority properly. Effective supervision encompasses four skills: organizing, directing, coordinating, and controlling. Elements of each skill are outlined. Theories of motivation discussed include McGregor's Theory X-Theory Y, Maslow's Hierarchy of Needs, and Herzberg's Theory of Motivation. Instructional aids, a posttest, and a skill test are included.

PB80-206535 PC **A05**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Residential Security in Multi-Family Housing. Instructor's Guide.
Feb 79, 100p HUD-PDR-537-25, HUD-0001315
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206543.

The instructor's guide on residential security in multifamily housing is 1 of 18 in a housing management curriculum developed by HUD to upgrade housing management skills. It reprints all the material in the participant's workbook, but gives more detailed information and answers the test questions.

PB80-206543 PC **A05**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Residential Security in Multi-Family Housing. Participant's Workbook.
Feb 79, 77p HUD-PDR-537-18, HUD-0001316
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206535.

The workbook on residential security in multifamily housing is 1 of 18 in a housing management curriculum developed by HUD for housing managers. It is designed to upgrade management skills in HUD-related or private housing. The workbook focuses on deterring criminal victimization and track with creating and maintaining a sense of safety through widespread community involvement in planning and implementing a security program. A general introduction to management's role in planning and administering a security program is presented, focusing on the development of an operational definition of security, an assessment of security needs, the utilization of community resources, the development of security program strategies, evaluation of security programs, and the obtaining of funds for security programs. Hardware and software components of a comprehensive security system are also discussed. In this context comments are made on technological detection devices, use of security personnel, the influence of resident attitudes and standards, the benefits of youth programs, and the possibilities of community assistance in a comprehensive security system. Resource lists and a self-evaluation questionnaire are included.

PB80-206576 PC **A07**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Professional Career Systems in Housing Management. Instructor's Guide.
Feb 79, 141p HUD-PDR-537-14, HUD-0001303
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206584.

The instructor's guide on professional career systems in housing management is 1 of 18 developed by HUD to upgrade management skills in HUD-related housing. It reprints all the material in the participant's workbook and gives more detailed information, where necessary. It also answers the test questions.

PB80-206584 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Professional Career Systems in Housing Management. Participant's Workbook.
Feb 79, 74p HUD-PDR-537-22, HUD-0001308
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206576.

Part of an 18-workshop HUD housing management curriculum, the workbook accompanies the workshop on major components of a career system. It familiarizes professional housing managers with these components and the ways to adapt them within different organizational contexts. First, the career system concept is introduced, with reference to job analyses and their importance to the overall career system. Then a standardized, performance-based evaluation mechanism is described as the second major component of a career system; a model performance-based evaluation system is outlined with sample evaluation forms. Third, the importance of a career ladder is discussed, and guidelines are provided for adapting a model career ladder to an existing career structure. The fourth component of a career system is a comprehensive education and training program aimed at accrediting personnel for their jobs. Worksheets and guidelines for identifying training needs are supplied, along with suggestions for fitting those needs into different organizational contexts. Finally, organizational supports are discussed, such as human variables and resources, the maximization of staff potential, and special counseling services. Measurable statements about what knowledge is expected from each component of the workshop are offered, along with short lists of the anticipated practical skills the student is expected to implement on the job using the information acquired in the workshop. References, and a posttest and skill are included.

PB80-206592 PC **A04**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Pest Control and Grounds Maintenance in Housing Management. Instructor's Guide.
Feb 79, 61p HUD-PDR-537-34, HUD-0001339
Grant HUD-H-2225G
See also Participant's Workbook, PB80-206600.

The instructor's guide on pest control and grounds maintenance in housing management is 1 of 18 developed by HUD to upgrade management skills in HUD-related housing. It reprints all the material in the participant's workbook and gives more detailed information, where necessary. It also answers the test questions.

PB80-206600 PC **A03**/MF **A01**
Temple Univ., Philadelphia, PA. Center for Social Policy and Community Development.
Pest Control and Grounds Maintenance in Housing Management. Participant's Workbook.
Feb 79, 43p HUD-PDR-537-21, HUD-0001340
Grant HUD-H-2225G
See also Instructor's Guide, PB80-206592.

The workbook deals with a workshop on pest control and grounds maintenance. The basic fundamentals of pest control are taught with descriptions of roaches, fleas, and beetles; identification of areas which pests commonly infest in a housing complex; a listing of pesticides; and a presentation of methods for pest control. A true-and-false posttest quizzes the information learned about pest control. Then major areas of grounds maintenance are identified, with attention to the tasks involved for each area (such as pruning, planting, patrolling, and cleaning). Insects that must be controlled outdoors are described, including chinch bugs, sod webworms, fall army worms, white grubs, whiteflies, and mealybugs. Finally, suggestions are given for managing lawn care; residents' responsibilities for lawn care are delineated also. A true-and-false posttest asks questions about grounds maintenance, and a skill test covers practical skills learned from workbook components on both pest control and ground maintenance. An instructor's guide is also available.

PB80-207780 PC **A06**/MF **A01**
Office of Education, Washington, DC.
Selected Bibliography of Egyptian Educational Materials: Volume 5, Number 1, 1979.
1980, 124p TT-79-59121/1
See also Volume 3, Number 1, PB-281 110-T. The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

A bibliography of educational materials in Egypt cites publications dealing with various phases of academic and technical training. Abstracts are presented of books and articles on organization, faculties, students, and teaching methods. Other topics are administration, testing, illiteracy, textbooks, social aspects, objectives, and higher education.

PB80-208812 PC **A03**/MF **A01**
Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS.
An Assessment of Differences between White Students' and Black Students' Involvement in Marine Related Activities,
Marlene M. Milkent, Bobby N. Irby, and Della McCaughan. May 80, 32p MASGP-79-018, NOAA-80061201
Grant NA79AA-D-00049

The Marine Attitude and Activity Assessment was administered to students enrolled in Marine Biology and selected other classes at Biloxi High School in March 1979. A total of 342 students answered all items on the survey, and constitute the sample on which comparisons were made. Most of the students were in the 10th or 11th grade and there was an almost equal distribution of males and females. However, since there were 267 white students compared to 75 black students, all results are expressed as percentages. The Marine involvement project was based on the premise that minority students do not participate in marine-related activities to the extent white students do. While the results of this investigation certainly support this contention, the reasons for this discrepancy are more complex than it was originally assumed. The results of this investigation certainly support the need to not only make students more aware of the marine environment by encouraging participation in marine-related activities, but also the need to provide instruction in such activities as swimming and water safety.

PB80-209893 PC **A07**/MF **A01**
Office of Personnel Management, Washington, DC. Office of Labor-Management Relations.
Digest of Labor Arbitration Awards in the Federal Service. Supplement No. 6.
Mar 80, 126p OPM/OLMR-80/3
See also report dated Mar 78, PB-285 688 and report dated Oct 79, PB80-131873.

The report is the fourth of periodic supplements to the March 1978 Digest of Labor Arbitration Awards

in the Federal Service. It provides subject headnotes, statements of issue, and summaries of the award and its basis, for additional arbitration cases as of March 1980. It also indicates the parties, the arbitrator, and the date of the award.

PB80-928113 PC E99/MF A01
Central Intelligence Agency, Washington, DC.
Directory of Soviet Officials, Volume IV: Science and Education; a Reference Aid.
Jul 80, 557p CR-80-13202
See also Volume 3, NTISUB/E/281-006.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928100.

The directory identifies over 7,000 individuals who hold positions in or are members of selected scientific and educational organizations in the USSR. The information includes a brief description of the function of major organizations; the name, highest earned academic degree and date of birth of the incumbent; and the date of election, appointment or earliest identification of the person in a position.

PB80-928210 PC E08/MF A01
Central Intelligence Agency, Washington, DC.
Directory of Chinese Officials: National Level Organizations; a Reference Aid.
Jul 80, 206p CR-80-12651
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928200.

The publication lists officials who hold leading positions in selected Chinese national level organizations.

UCRL-83663 PC A02/MF A01
California Univ., Livermore. Lawrence Livermore Lab.
Selecting Personnel to Work on the Interactive Graphics System.
F. J. Norton. 30 Nov 79, 12p CONF-791146-1
Contract W-7405-ENG-48
Symposium on automation technology in engineering drawing, Monterey, CA, USA, 13 Nov 1979.

The paper established criteria for the selection of personnel to work on the interactive graphics system and mentions some of human behavioral patterns that are created by the implementation of graphic systems. Some of the social and educational problems associated with the interactive graphics system will be discussed. The project also provided for collecting objective data which would be useful in assessing the benefits of interactive graphics systems. (ERA citation 05:008961)

5J. Psychology (Individual and Group Behavior)

AD-A086 321/7 PC A03/MF A01
Delaware Univ Newark Dept of Psychology
A Dual Task Analysis of Controlled and Automatic Detection.
Technical rept.,
James E. Hoffman, Billie Nelson, and Mark Laubach. 21 May 80, 35p ONR-CR-80-01
Contract N00014-78-C-0762
Report on Project PLATO.

The secondary task methodology was used to measure the resource demands of controlled and automatic detection. Subjects were required to perform a secondary task of locating a flickering light together with a primary task of visual letter detection. Secondary task performance was lower when combined with the search task than in corresponding single channel control conditions. In addition, this decrement was approximately the same for both controlled and automatic detection. Similarly, both controlled and automatic detection latencies were increased in the presence of the secondary task and by the same amount. Controlled and automatic detection evidently share common resource demanding components. (Author)

AD-A086 405/8 PC A04/MF A01
Florida State Univ Tallahassee Dept of Movement Science and Physical Education
The Influence of Learning Strategies in the Acquisition, Retention, and Transfer of a Procedural Task.
Interim rept. Apr-Jun 79,
Robert N. Singer, Susan Ridsdale, and Gene G. Korienek. Aug 79, 69p ARI-TR-408
Contract MDA903-77-C-0200

In order to analyze the effectiveness of various learner strategies upon initial learning, retention, and subsequent transfer of a motor skill, 50 college-age subjects were randomly assigned to one of five strategy conditions: imagery, chunking, verbalization, informed-choice, and control. For the task, a serial manipulation apparatus required participants to manipulate a predetermined sequence of buttons and switches. Following learning trials, participants were administered a retention test. A transfer task was administered in order to discern the generalizability of specific strategies. Separate analyses for errors by positions, total errors, and total time revealed that imagers performed better on both acquisition and transfer than the chunking, verbalization, or informed-choice groups. (Author)

AD-A086 407/4 PC A04/MF A01
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
A Review of the Literature on Memory Enhancement: The Potential and Relevance of Mnemotechnics for Military Training.
Technical rept.,
Douglas Griffith. Dec 79, 73p Rept no. ARI-TR-436

This report reviews the literature on memory enhancement and assesses the potential of techniques designed to enhance memory (mnemotechnics) for military training. An overview describes a wide range of mnemotechnics. After a review of the empirical literature on mnemotechnics, a research strategy is offered for applying mnemonics and mnemotechnics to military training. Mnemonics and mnemotechnics have the potential to significantly enhance training effectiveness. However, if they are not carefully researched and implemented, it is likely that their training potential will be mitigated, if not entirely lost. This report is intended primarily for professional researchers to identify areas of needed research. It can also be used by the military training community to assess the training potential of mnemonics and mnemotechnics. (Author)

AD-A086 408/2 PC A03/MF A01
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Usefulness of Readability Formulas for Achieving Army Readability Objectives: Research and State-of-the-Art-Applied to the Army's Problem.
Technical rept.,
Richard P. Kern. Jan 80, 44p Rept no. ARI-TR-437

This report was prepared to assist the Army in evaluating the usefulness of readability formulas in identifying material that will be comprehended by readers at a given reading skill level. Existing readability methods and research findings were reviewed against three major criterion questions. These questions and conclusions reached for each are as follows: (1) Question: How effectively do formulas predict comprehension at targeted reading grade levels. Conclusion: Formulas cannot match material to reader, (2) Question: Does rewriting to lower readability scores increase comprehension. Conclusions: Rewriting to lower the formula reading grade level score does not increase comprehension, and (3) Question: How will formula score requirements affect production of written materials. Conclusion: Requiring that text be written to satisfy a targeted reading grade level score focuses attention on meeting the score requirement rather than on organizing the material to meet the readers' information needs. An approach is outlined for developing a broader based method and criteria to by-pass the serious deficiencies of present day readability formulas.

AD-A086 477/7 PC A02/MF A01
School of Aerospace Medicine Brooks AFB TX
What the Repatriated Prisoners of War Wrote about Themselves,
David R. Jones. 1980, 5p Rept no. SAM-TR-80-228
Pub. in Aviation, Space and Environment Medicine, v51 n6 p615-617 Jun 80.

No abstract available.

AD-A086 514/7 PC A04/MF A01
Yale Univ New Haven CT Dept of Psychology
Intelligence and Nonentrenchment.
Research rept. 1 Jan-31 Mar 80,
Robert J. Sternberg. 1 Apr 80, 56p Rept nos. RR-2-80, TR-23
Contract N00014-78-C-0025

This article suggests that intelligence can best be understood through the study of nonentrenched, i.e., novel, kinds of tasks. Such tasks require subjects to use concepts or form strategies that differ in kind from those to which they are accustomed. It is suggested that the only partial success of the cognitive-correlates and cognitive-components approaches to intelligence that are in contemporary favor might be due in part to the use of tasks that are more entrenched (familiar in kind) than would be optimal for the study of intelligence. Two nonentrenched tasks are described, one requiring projection into the future of states of objects, the other requiring complex analogical reasoning where multiple terms of analogies can be replaced by alternative answer options. Research into the first task focused upon performance components of task solution (i.e., components used in the execution of strategy); research into the second task focused upon metacomponents of task solution (i.e., components used in the planning of strategy). Correlations of task and component latencies were generally higher than those obtained in most contemporary information-processing research on the nature of intelligence. Some speculations are made about the implications of these results for educational theory and practice. (Author)

AD-A086 584/0 PC A05/MF A01
Maryland Univ College Park Coll of Business and Management
Goal Setting and Task Performance: 1969-1980.
Technical rept.,
Edwin A. Locke, Karyll N. Shaw, Lise M. Saari, and Gary P. Latham. Jun 80, 94p Rept no. GS-1
Contract N00014-79-C-0680

A review of both laboratory and field studies on the effect of setting goals when learning or performing a task found that specific, challenging goals led more often to higher performance than easy goals, 'do your best' goals or no goals. This is one of the most robust and replicable findings in the psychological literature, with 90% of the studies showing positive or partially positive results. The main mechanisms by which goals affect performance are by directing attention, mobilizing effort, increasing persistence, and motivating strategy development. Goal setting is most likely to improve task performance when the goals are specific and sufficiently challenging, when the subjects have sufficient ability (and ability differences are controlled), when feedback is provided to show progress in relation to the goal, when rewards such as money are given for goal attainment, when the experimenter manager is supportive, and when the assigned goals are actually accepted by the individual. No reliable individual differences have emerged in goal setting studies, probably because goals were typically assigned rather than self-set. Need for achievement and self esteem may be the most promising individual difference variables. (Author)

AD-A086 756/4 PC A03/MF A01
Houston Univ TX Dept of Psychology
A Multivariate Investigation of Employee Absenteeism.
Technical rept.,
James R. Terborg, Gregory A. Davis, Frank J. Smith, and Mark S. Turbin. May 80, 33p Rept no. TR-80-5
Contract N00014-78-C-0756

Survey data on attitudes and demographic characteristics were collected from 136 full-time and 123

part-time retail employees in seven stores of the same organization. Personal variables were unrelated to absences. Satisfaction with work, pay, and co-workers were predictive of absences but the correlations were small. Examination of organization location effects showed mean differences across stores on several variables and differential validity was observed across stores. Importance of situational factors is discussed. (Author)

AD-A086 770/5 PC **A04**/MF **A01**
Army Military Personnel Center Alexandria VA
Affective Responsivity to Varying Modes of Police Dress.
Master's thesis,
William L. Taylor. 16 Apr 80, 64p

Responding to what was perceived as a negative image of police, law enforcement agencies in the early 1970's, began to change their traditional uniform to a 'soft-look' civilian type blazer uniform. The movement to change the uniform was based on the assumption--which had not been empirically examined--that the traditional uniform with its official insignia and other accouterments overwhelmed citizens and engendered a wide range of negative reactions and that removal of these symbols (i.e., the uniform) would result in a more positive relationship between the public and the police. The present investigation assesses the reactions of individuals to varying modes of police dress using a method that considered both physiological and cognitive components of affective responsivity. A 2 (race of participant) X 3 (style of police dress) between-within design was used. The between factor was race of the participant (i.e., black or white), and the within factor was style of police dress. Eighteen black and eighteen white male undergraduate students viewed color slides that depicted the varying styles of police dress. The results reflected that participants did not evaluate the various modes of police dress differently and that there were no racial differences in the evaluation of the various modes of police dress.

AD-A086 796/0 PC **A09**/MF **A01**
Yale Univ New Haven CT Dept of Psychology
Reasoning, Problem Solving, and Intelligence.
Technical rept. 1 Jan-31 Mar 80,
Robert J. Sternberg. 1 Apr 80, 192p Rept nos. RR-3-80, TR-24
Contract N00014-78-C-0025

This report reviews the psychological literature at the interface of reasoning, problem solving, and intelligence. It begins a discussion of some of the questions a theory of reasoning or problem solving should address, and with some suggestions as to how these questions can be addressed empirically. Next, the literature on reasoning and intelligence is reviewed. This review is divided into two parts, one on induction and one on deduction; the former part pays particular attention to the literature on analogies, the latter part to the literature on linear syllogisms. Then, the literature on problem solving and intelligence is reviewed --first on problems with well-defined solution spaces. The first part pays particular attention to the literature on the missionaries and cannibals problem, the latter part to the literature on the hatrack problem.

AD-A086 797/8 PC **A04**/MF **A01**
Yale Univ New Haven CT Dept of Psychology
Claims, Counterclaims, and Components: A Countercritique of Componential Analysis.
Technical rept. 1 Apr-30 Jun 80,
Robert J. Sternberg. 1 Jun 80, 57p Rept nos. RR-4-80, TR-25
Contract N00014-78-C-0025
See also Rept. no. RR-5-79, TR-19 dated 1 Oct 79, AD-A079 760.

This article summarizes criticisms that have been leveled at the author's componential subtheory of human intelligence, and presents his responses to these criticisms. The general topics covered in the article are the nature of intelligence; the componential approach to intelligence; the notion of the component, including the nature of components, methods for identifying components, and the knowledge base upon which components operate; componential analysis compared to alternative paradigms, including the factorial one and the information-processing one; and the contribution of componential analysis to the study of intelligence. The article is a reply to commentaries on 'Sketch of a Componential Subtheory of Human Intelligence,' which is to appear in the Behavioral and Brain Sciences along with the commentaries by 16 psychologists in the field of human intelligence. (The 'Sketch' is a modified version of the author's 'Components of Human Intelligence' AD-A079 760.)

AD-A086 808/3 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Engineering-Psychology Research Lab
An Investigation of the Dual Task Performance Relationship to Hemispheric Specialization.
Interim rept.,
Christopher D. Wickens, and Diane Lynn Sandry. Jun 80, 41p Rept no. EPL-80-1/ONR-80-1
Contract N00014-79-C-0658

The efficiency of dual task performance may be influenced by a number of variables such as the level of practice of the individual, the difficulty of the task, and the particular processing resources or capacities for which the two tasks compete. The current research investigates the relation between the capacities employed in two tasks--a verbal processing resource inferred to reside in the left cerebral hemisphere, and a spatial resource in the right--and the controlling hand. Specifically a condition of task-hemispheric integrity is defined when the processing and responding of each task is carried out in a single cerebral hemisphere. In the experiment, this condition occurs when a tracking task, inferred to be spatial right-hemispheric in its processing is controlled with the left hand, while a Sternberg memory search Reaction Time task with the letter stimuli, inferred to be verbal left hemispheric, is responded to with the right hand. A 'mixture' condition is created with the opposite hand assignment, so that each hemisphere processes the information associated with one task, while responding to the other (i.e., Sternberg Task-left hand, Tracking-right hand).

AD-A086 851/3 PC **A03**/MF **A01**
Yale Univ New Haven CT Dept of Psychology
Componential Approaches to the Training of Intelligent Performance.
Technical rept. 1 Jan-31 Mar 80,
Robert J. Sternberg, Jerry L. Ketron, and Janet S. Powell. 1 Apr 80, 50p Rept nos. RR-1-80, TR-22
Contract N00014-78-C-0025

This article proposes that 'componential' approaches to the training of intelligent performance are a useful means for producing and understanding improvements in such performance. The outcomes (some of them preliminary) from three experiments conducted at Yale, are cited. The results of these experiments show that at least some optimal strategies for intelligent performance can be trained; that certain strategies are better, on the average, than others; that the properties of strategies that make them 'better' or 'worse' can, at least in some cases, be isolated through componential means; that certain strategies are preferable for people with certain ability patterns, but that other strategies are preferable for people with other ability patterns; that certain strategies are preferable for use with certain stimulus types, but that other strategies are preferable for use with other stimulus types; and that people may be quite cognizant of the strategy they are trying to employ while at the same time being quite incognizant of the strategy they are actually employing, or of the difference between the two strategies.

AD-A086 876/0 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Psychology
Differentially Weighting Linear Models of Behavior: An Empirical Comparison of Six Methods.
Technical rept.,
Charles K. Parsons, and Charles L. Hulin. Jun 80, 35p Rept no. TR-80-4
Contract N00014-75-C-0904

Six methods of estimating regression weights for a linear model of behavior were compared in 51 samples of National Guardsmen. Ordinary least squares, Bayesian m-group regression, ridge regression, equal weighting, and two related methods were used. Weights were estimated in one-half of each sample and then applied to data in the other half. Ratios of observations to predictors ranged from 4:1 to 19:1. Cross validation R sq was used as the index of model or equation stability. Results support earlier findings that least squares weights are relatively unstable in small samples, but do not indicate the superiority of any one other method. Future research and implications for using these regression techniques in testing behavioral models are discussed. (Author)

ED-178 027 Not available NTIS
Psychophysiology of Visual Space in Film and Television.
M. F. Malik. 1977, 9p
For related document, see IR-005 024.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Some of the theories which have been developed to explain how visual space is actually perceived, processed, and stored in the human brain are briefly noted, and the correspondence of contemporary systems of stereocinematography and holography to the neural processes of the brain is explored. Major concepts discussed include projective geometry, three dimensional perception, space perception, human information channels, and segmented space systems. The comprehension of these concepts was the foundation for modern stereocinematography techniques. Segmented space systems are said to be similar to stereocinematography, where the viewer is confined to a certain area, viewing the angle and precise timing of the show so the psychodramatic information impact is decreased geometrically with the length of time. Holography is described as a typical example of the use of projective geometry, where the viewer is in the movable horizon or place so his/her own eyes are a vanishing point or camera, and with every movement of his/her eye or head the entire picture will change its projective geometry.

ED-178 029 Not available NTIS
Michigan State Univ., East Lansing. Dept. of Communication.
An Analysis of Family Role Structures and Interactions in Commercial Television.
Rept. no. 6,
Mary Hines. Nov 78, 41p
Sponsored in part by Office of Child Development, Washington, DC. Paper presented to Mass Communication Division of the Speech Communication Association, Minneapolis, MN. on November 1978.
For related documents, see IR-007 415, IR-007 621, IR-007 629-630, and IR-007 634.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report describes the results of a study of family role structures and family role interaction patterns of U.S. television families appearing during prime time and Saturday morning programs for the 1976-1977 season. The content analysis constitutes a role-by-behavior description of verbal interaction among television families, the coding unit being any act or sequence of acts initiated by a family member and directed to another family member which is unitary with respect to direction, mode, and recipient. Each act was assigned to one of several nominal level categories along such dimensions as the act initiator, directions and modes (going toward, away, or against), the act recipient, and the family structure. Coder training procedures and interrater reliability percentages are described. Discussion of findings is supported by tables displaying the data collected, and a 52-item bibliography is provided. Appendices include a list of the programs studied and a table of family interactions for these programs.

ED-178 031 Not available NTIS
Michigan State Univ., East Lansing. Dept. of Communication.
Pro-Social and Anti-Social Behaviors on Commercial Television in 1975-76.
Rept. no. 1,
Bradley S. Greenberg. Feb 77, 78p
Contract DHEW-90-C-635
For related documents, see IR-007 415, IR-007 617, IR-007 621, IR-007 630, and IR-007 634.

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This study investigates pro-social and anti-social behaviors portrayed on prime time and Saturday morning television during the 1975-76 season. An initial review of relevant research in this behavioral area is followed by a description of the basic content categories for pro-social and anti-social behaviors, motives and consequences of these behaviors, the measurement of act intensity, coder training program, coder reliability estimative procedures, and samples of television content. A total of 92 programs comprising 68.5 hours of viewing were analyzed for this study and results are discussed for a variety of frequency and time categories. Appendices include intensity of acts, shows by program type and representative intensity levels for both pro- and anti-social acts.

ED-178 052 Not available NTIS
The Effects of Televised Drug Commercials on Children,
Deborah Lovitky Sheiman. 1977, 7p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper addresses the issue of non-prescription drug commercials appearing on commercial television and the impact that they have on children. Self-regulatory standards set by the National Association of Broadcasters are cited, and research concerning children and drug commercials is discussed. A brief bibliography is included.

ED-178 055 Not available NTIS
The Home, The School, The Child: The TV Connection,
Sandra T. Gray. 17 Mar 79, 11p
Paper presented at the Regional Conference on Parent Participation TV Workshops for Civic, Religious, Educational and Parent Leaders and Their Families at Princeton, NJ on March 17, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper discusses effective parenting and how television can be used to stimulate communication between parent and child. Research on viewing habits, and social statistics on teenage pregnancy and drug and alcohol use provide a background for examining parent-child communication and lead into a discussion of Kohlberg's theories of moral development and Bloom's patterns of parental behavior.

ED-178 070 Not available NTIS
Simulating American Social Structure: An Interactive Game-Simulation for Career and Life Cycle Decisions,
Scott C. Shreiner. Apr 79, 23p
Paper presented at the Annual Conference on Instructional Computing Applications of the Indiana University Computing Network (6th), Indiana Univ., South Bend, IN. April 24-25, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

CALIS is an interactive computer-based simulation developed to assess career decisions and to present decisional alternatives to the players in career and life path choices, assessing the relative consequences associated with these choices. The CALIS game-simulation places the player in the social-psychological situation of an individual confronting American society during the late adolescent through early middle age stages of the life cycle. This social-psychological situation is simulate-operationalized as a micro-economic decision making process where a player allocates his or her time and money to various aspects of the game. The mode of play permits the player to allocate these resources in any 'life area', allowing the players to determine the importance of each area and the order of play. Beyond the resource allocation consideration, CALIS also collects player self-evaluations of the utility of their major decisions and the probability of success of attaining their game-oriented goals. The computer uses a graphic ratio-to-standard measure to make these utility and probability determinations.

HRP-0900151/2 PC **A23**/MF **A01**
Bureau of Health Manpower, Hyattsville, MD. Div. of Medicine.
Application of the Myers-Briggs Type Indicator to Medicine and Other Health Professions, Monograph I.
Final rept.,
Mary H. McCaulley. Aug 77, 549p
Contract PHS-231-76-0051
See also HRP-0900152 (Monograph II).

The Myers-Briggs Type Indicator is a questionnaire specifically designed by Isabel Briggs Myers and Katharine C. Briggs to make it possible to test and put to practical use that part of the personality theory of the Swiss physician and psychologist, C. G. Jung which is concerned with psychological type. The theory has particular relevance to many practical issues, because it attempts to explain why normal people see the same event very differently, and how they can start from the same data and come to quite different conclusions. The essence of the theory, which will be described more fully in a later section, is that 'much apparently random variation in human behavior is actually quite orderly and consistent, being due to certain basic differences in the way people prefer to use perception and judgment'. Type differences occur in almost every human activity, because type theory is concerned with fundamental processes of behavior. Differences in the way situations are perceived affect interests, motivations and knowledge of the situations themselves. Differences in judgment affect the content and style of decision-making. Differences in attitude affect the relative weight given to impersonal factors and subjective ideas, and to relative importance of understanding events or of controlling events. It is a common experience for those becoming acquainted with Jung's theory to experience a sense of familiarity because Jung's constructs and observations fit everday observations of life. The strength of the theory is that it puts together these everyday observations in ways that increase understanding of events and permit clearer conceptualization of issues and more refined predictions.

PB80-201585 PC **A06**/MF **A01**
Institute of Medicine, Washington, DC.
Smoking and Behavior. Health and Behavior: A Research Agenda.
Interim rept. no. 1.
May 80, 107p IOM-80-001
Contract PHS-282-78-0163-EJM
Summary of an Invitational Conference, September 27-28, 1979, Washington, DC.

A Conference on Smoking and Behavior was held on September 27 and 28, 1979, at the National Academy of Science in Washington, D.C. The conference was organized by the Institute of Medicine, through its Division of Mental Health and Behavioral Medicine. Support was provided by the Alcohol, Drug Abuse, and Mental Health Administration and the National Institute of Health, Department of Health, Education, and Welfare. This meeting was the first in a series of six invitational workshops to be conducted over a two-year period, for a study of 'Health and Behavior: A Research Agenda'. This study is designed to assess the present and potential contribution of the behavioral science to our understanding of several serious and widespread public health problems. The goal of this enterprise is to find ways in which both the biomedical and behavioral sciences can be employed to reduce the burden of illness in this country.

PB80-202732 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Sample Sizes for Specified Statistical Power in Testing for Differential Validity,
Marvin H. Trattner, and Brian S. O'Leary. Mar 80, 14p PRR-80-1

Tables are presented which contain the required n's to test for the significance of the difference between correlations (Fisher z's) at power equal to .5, .8, and .9,alpha levels of .01 and .05. The relevance of the tables for controversies dealing with the existence of differential validity is discussed. The typical differential validity study contains inadequate sample sizes in the two groups to test for the existence of the concept at a respectable level of statistical power. This results in a lessened probability of detecting differences in validity. Differential validity studies are technically feasible much less frequently than commonly assumed, since they are very likely to produce inconclusive results.

PB80-203672 PC **A03**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Maryland Masonic Home on June 21, 1979.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 31 Aug 79, 31p NBS-GCR-80-243
Grant NBS-7-9014

This fire incident at the Maryland Masonic Home on June 21, 1979 was detected by a housekeeper upon entering resident room 116 at approximately 0910 hours and observing a light accumulation of smoke at the ceiling. The housekeeper turned on a window fan in the unoccupied room to remove the smoke, and left the room closing the door, to report the smoke. The housekeeper reported the smoke to the administrator who immediately ordered the fire department to be notified. The housekeeper and the administrator returned to room 116 to investigate the source of the smoke. Upon opening the closet doors, flames involving the contents evolved. The administrator ordered evacuation of the first floor and the assistant administrator extinguished the fire with the application of two, five pound, listed dry chemical extinguishers, rated 2A, 10BC. Three residents from the adjacent section A of the first floor were assisted in their evacuation by staff. Most of the residents of this facility were already outside the building due to a scheduled field trip, and approximately eight per cent of the residents are ambulatory. The fire and smoke effects of this fire incident were primarily limited to room 116 in this 100 bed facility of fire resistive construction, erected in 1934. The Baltimore County Fire Department responded and verified extinguishment with overhaul operations, and also conducted ventilation procedures.

PB80-204738 PC **A13**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Proceedings of International Seminar on Human Behavior in Fire Emergencies (2nd) Held on October 29-November 1, 1978.
Final rept.,
Bernard M. Levin, and Roseanne L. Paulsen. Jun 80, 281p NBSIR-80-2070

The safety of building occupants in fire emergencies depends on both the fire protection features of the building and the actions of the occupants. Until recently fire protection experts have relied mainly on experience and intuition regarding the capabilities and actions of building occupants in the development of fire protection systems and training programs. Research projects underway can assist the fire protection experts by providing them with needed information to supplement their experience and intuition. This report contains summaries of some of the recent research in this field as reported at an international seminar on the subject. It also contains the invited papers presented at the seminar on the topic of panic.

PB80-205180 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Performance of Racial/Ethnic Groups on the Written Test of the Professional and Administrative Career Examination (Pace).
Final rept.,
Hilda Wing. Dec 79, 20p TM-79-8

Self-identification of racial/ethnic membership was requested of 1373 PACE competitors in fulfillment of a court order. One-quarter of the group failed to provide such identification. Test scores and ratings, including those of individuals who did not comply with the request, were analyzed. The representativeness of the group for all PACE competitors was limited.

PB80-206204 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Fire Protection Engineering.

An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Sheppard and Enoch Pratt Hospital on June 24, 1979.
Final rept.,
John L. Bryan, and James A. Milke. 31 Aug 79, 26p NBS-GCR-80-244
Contract NBS-7-9014

The fire was detected by a security officer during a normal routine patrol at approximately 2016 hours. The security officer observed smoke issuing into the corridor from room 48A, a laundry room, with a closed door. The security officer immediately activated an alarm box on the local alarm system, phoned the facility operator, and then radioed the security office. The fire incident occurred on the ground floor of the 'B' building erected approximately 80 years ago of fire resistive construction. The security officer obtained a five pound dry chemical listed extinguisher, rated 2A, 10BC, entered the laundry room, crawled to a trash can which contained the fire and discharged the extinguisher which effectively extinguished the flames. The fire was extinguished prior to the arrival of the facility fire brigade and the Baltimore County Fire Department. The Fire Department verified extinguishment, overhaul, and ventilation of the laundry room area. No patients were in the fire area, and no patients were evacuated.

PB80-207228 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Fire Protection Engineering.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Kensington Gardens Nursing Home on April 14, 1979.
Final rept.,
John L. Bryan, and Philip J. DiNenno. 30 Jun 79, 26p NBS-GCR-80-242
Grant NBS-7-9014

The fire incident at the Kensington Gardens Nursing Home on April 14, 1979 was initially detected by a nurse on the first floor, central wing as an odor of smoke in the corridor adjacent to room 123, at approximately 0115 hours. The nurse detected smoke in room 123 and observed smoke issuing from an electrical unit heater in the room. The nurse immediately disconnected the electrical power cord to the heater from the wall socket and evacuated the single female patient in her bed from the room, along the corridor beyond the smoke barrier doors to the new section. During the evacuation of the patient other nursing staff were alerted, the local alarm system activated, the facility emergency procedures initiated and the Montgomery County Emergency Operations Center notified. The Kensington and Silver Spring Volunteer Fire Departments responded, verified extinguishment and conducted ventilation operations. The patient and one nursing staff member were transported by ambulance to the hospital for medical observation and examination as a precautionary measure.

5K. Sociology

AED-Conf-77-352-005 PC **A02**/MF **A01**
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).
Technological Hazards in the Understanding of Society.
W. Diepold. 1977, 11p CONF-771177-1
In German.GRS experts' talk on nuclear energy and risk, Muenchen, F.R. Germany, 3 Nov 1977. U.S. Sales Only.

This is a discussion of how employees of industry, an important part of society, and how the consumers and hence the whole volume of society express their attitude with respect to technological hazards in their practical activities and how the conclusions can be drawn from this that the population is thoroughly familiar in dealing with potential hazards. (Atomindex citation 09:365541)

PB80-196534 PC **A05**/MF **A01**
Pennsylvania Univ., Philadelphia.
Women's Labor Force Participation and Fertility: A Comparison of Evidence from the National Longitudinal Survey of Young Women and the Consumer Panels.
Final rept. 1 Sep 78-1 Dec 79,
Eileen M. Crimmins. Dec 79, 97p 5-24840, DLETA-21-42-78-55
Grant DL-21-42-78-55

The purpose of the study has been to replicate analyses originally done with the Consumer Panel data using data from the National Longitudinal Survey of Young Women. In spite of the differences between the two samples in demographic characteristics and the variability in operational definitions of theoretical concepts, results of these analyses relating women's employment and fertility are often similar. Where differences exist they can in part be attributed to differences between the two samples in their stages in the family life cycle; the social and economic climate at the time of marriage and early childbearing; and the socioeconomic characteristics of the sample. The relationships between employment and fertility are not the same for white and black women in the NLS sample. The findings for white women are more similar to the findings from the Consumer Panel than are those for black women.

PB80-198591 PC **A03**/MF **A01**
Georgia Inst. of Tech., Atlanta. Coll. of Architecture.
Provisions for Elderly and Handicapped Pedestrians. Volume 1. Executive Summary.
Final rept. Jun 74-Dec 78,
John Templer. Jan 79, 50p FHWA/RD-79-1
Contract DOT-FH-11-8504

Investigations were carried out in order to isolate the problems and hazards experienced by elderly and handicapped pedestrians, the results expressed in typological form, were prioritized; and some of the high priority environmental problems became the focus for later stages of the research. Curb ramp criteria and tactile surface materials were evaluated and the results incorporated into countermeasures which were field tested. The priority accessible network as a conceptual approach to barrier free urban areas has been developed; and a methodology for establishing the network is described.

PB80-199110 PC **A04**/MF **A01**
Southern California Association of Governments, Los Angeles.
Housing Locator. Section 8: Rental Assistance Opportunities. A Guide to Assisted Rental Housing in Los Angeles, Ventura, Orange, Riverside, San Bernardino, and Imperial Counties.
Joe Carreras. Apr 80, 52p

The Housing Locator identifies the location of subsidized housing developments within the planning area of the Southern California Association of Governments (Ventura, Los Angeles, Orange, San Bernardino, Riverside and Imperial counties). Federally assisted housing units under construction or in management as of April, 1980 are identified by HUD reference number, project name and address, locality, total units, etc. These developments provide rental assistance to eligible tenants through the Section 8 Housing Assistance Payments and the conventional public housing programs. Eligibility and Fair and Equal Housing Opportunity information is also included.

PB80-200306 PC **A04**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
New York-New England Recreation Demand Study. Volume I. Executive Summary Highlights of the Northeast Recreation Methodology Project,
Vincent A. Scardino, Josef Schwalbe, Marianne Beauregard, Christine Bottom, and Paul G. Oostenbrug. 1980, 72p W80-05804, OWRT-C-7207(6228)(1)
Contract DI-14-34-0001-6228
See also Volume 2, PB80-200314. Prepared in cooperation with Massachusetts Dept. of Environmental Management, Boston.

A computer forecasting methodology was developed for outdoor recreational activities in the seven states in the northeastern part of the United States (Connecticut, Maine, Massachusetts, New York, New Hampshire, Rhode Island, and Vermont). The model is designed to be used by planners to assess the potential effect of different supply configurations in the region and to anticipate future participation in outdoor recreational activities.

PB80-200314 PC **A15**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
New York-New England Recreation Demand Study. Volume II. Analysis and Computer Modeling of Summer Outdoor Recreation Activities in the Northeast,
Vincent A. Scardino, Josef Schwalbe, Marianne Beauregard, Christine Bottom, and Paul G. Oostenbrug. 1980, 347p W80-05805, OWRT-C-7207(6228)(2)
Contract DI-14-34-0001-6228
See also Volume 1, PB80-200306. Prepared in cooperation with Massachusetts Dept. of Environmental Management, Boston.

A computer forecasting methodology was developed for outdoor summer recreational activities in the seven states in the northeastern part of the United States (Connecticut, Maine, Massachusetts, New York, New Hampshire, Rhode Island, and Vermont). The model is designed to be used by planners to assess the potential effect of different supply configurations in the region and to anticipate future participation in outdoor recreational activities.

PB80-200348 PC **A02**/MF **A01**
National Community Action Agency Executive Directors Association, Washington, DC.
The Triple Threat: Inflation and Low-Income Families,
Michael Mazerov, and Robert Howard. May 80, 25p CSA-LN-2557
Grant CSA-30232-D-80-01

The paper describes the impact of inflation on low-income families in the basic necessities of food, energy, housing and health care, and how the indexing of social welfare benefits has not kept up with the concentration of inflation in the necessities. The situation is intensified by a political backlash among middle-income groups to cut taxes and government spending. Suggestions for government policies to deal with this problem are given.

PB80-200652 PC **A09**/MF **A01**
New Orleans Univ., LA. Archaeological and Cultural Research Program.
Archaeology of the Jazz Complex and Beauregard (Congo) Square, Louis Armstrong Park, New Orleans, Louisiana,
J. Richard Shenkel, Robert Sauder, and Edward R. Chatelain. 1979, 189p RR-2
Prepared in cooperation with New Orleans, LA.

The archaeology of the Jazz Complex and Beauregard (Congo) Square within Louis Armstrong Park was undertaken to mitigate by archaeological salvage the adverse impact of proposed activities associated with the construction of several facilities within the park.

PB80-201338 PC **A03**/MF **A01**
National Community Action Agency Executive Directors Association, Washington, DC.
Public Policy and the Low Income Matrifocal Family,
Charles Ball, and James Halvorson. May 80, 50p CSA/LN-2558
Grant CSA-30232-D-80-01

A rapidly growing proportion of American families are single parent families headed by women: a large percent of these families are poor. Using data from a study conducted in Pueblo, Colorado, the authors identify the major social and economic problems facing matrifocal families. Their analysis of the service utilization patterns implies that while many of the services needed by matrifocal families exist, fragmentation in program planning, funding, and administering prevents families from obtaining assistance and support. To emphasize the need for fair employment opportunities for women, the authors devote a second section of the report to employment issues.

PB80-201486 PC A03/MF A01
Swedish Council for Building Research, Stockholm.
Small Communal Laundries in Block of Flats: Planning, Equipment, Handicap Adaption,
Britt Pedersen. 1980, 30p D14:1980, ISBN-91-540-3221-0

The primary requirements which must be made for a communal laundry is that it must be adapted to the laundry quantities, laundry needs and available time of the households. In addition, the equipment must be such that the work involved and the consumption of electricity and water are kept as low as possible. It is also important that the laundry facility be regarded as an attractive work environment. The following topics are discussed: Small communal laundries offer many advantages (In the same building, Possibilities for unscheduled laundering, Economically advantageous, Easy to agree on laundering times); Calculation of laundry capacity; Equipment in the laundry (Washing machines, Spin dryer, Tumbler dryer and drying cabinets, Work table, Sink unit, Cold mangle); Information on equipment; Energy conservation measures (Heat exchanger, Outdoor drying); Location of equipment; Work areas which also suit the physically handicapped; Work postures are improved if the machines are placed on a higher level; Layouts; Standards for laundries.

PB80-201676 PC A10/MF A01
People-to-People Committee for the Handicapped, Washington, DC.
Developments in Services for Handicapped People, Africa. A Project Report. Interchanges of Leaders and Information Relating to Rehabilitation Services - United States and Africa.
Mar 80, 225p
Grant PHS-22-P-57985/3-03

The project identified programs and leaders in the rehabilitation of the handicapped in African countries and arranged interchanges with organizations having similar interests in the United States. Communications with African countries have shown great promise of interchanges that can be of mutual benefit, thus leading to simpler and less costly rehabilitation approaches in the United States. Opening a flow of people and ideas between the United States and Africa also generated specific opportunities for joint research efforts on disabilities common to our societies.

PB80-203029 PC A09/MF A01
Alabama Office of State Planning and Federal Programs, Montgomery.
Economic Development Adjustment Program to Assist Mobile and Baldwin Counties, Alabama, in Their Economic Recovery Following Hurricane Frederic.
Final rept.,
William Blunt, and Thomas P. Dunne. Apr 80, 187p EDA-80-0103
Prepared by Blunt (William) Associates, Inc., Washington, DC.

The destruction left by Hurricane Frederic in Mobile and Baldwin counties in Alabama was widespread and severe. For these reasons, immediate Title IX implementation emphasis was placed on strengthening the permanent capacity of the South Alabama Regional Planning Commission to provide planning and technical assistance and outreach to communities in the study area to enhance local economic development process, and to help implement many of the adjustment activities proposed in the study.

PB80-203292 PC A04/MF A01
California Univ., Berkeley.
Proceedings of National Boating Facilities Conference (2nd) Held at the Berkeley Marriott Inn, Berkeley, California on October 22-24, 1979,
Andrew T. Manus. Oct 79, 72p NOAA-80061001
Grant NOAA-04-8-M01-189

During October 22-24, 1979, the University of California Sea Grant College Marine Advisory Program (Cooperative Extension) in cooperation with the National Marine Manufacturers Association cosponsored the Second National Boating Facilities Conference. The focus of the conference was on facilities--the financing, designing, permitting, and operations and management of recreational boating development.

PB80-204118 CP T99
Employment and Training Administration, Washington, DC. Office of Program Evaluation.
CLMS-1 (Continuous Longitudinal Manpower Survey), Public Use Tape for Sampled January-June 1975 CETA Enrollees.
Data file,
Jaime Salgado, Tip Dow, and Nancy Caldwell. 20 Jul 80, mag tape MEL-80-X-7, DOL/DF-80/001
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-204126, and PB80-204134.

The CLMS-1 public use data tape is one of three sets of tape files containing data from the Continuous Longitudinal Manpower Survey (CLMS) being released in July 1980. The CLMS is the major data development effort of the U.S. Department of Labor for evaluation of the decentralized employment and training programs funded under the Comprehensive Employment and Training Act (CETA). The CLMS-1 tape contains three separate files. The first file contains 6650 individual records on persons enrolled in CETA programs between January and June 1975. The data file contains microdata on sampled individuals from three sources: prime sponsor records a series of up to four interviews with sampled enrollees, and social security earnings records (1951-1977). The second and third files contain the documentation for the tape. The second file (the 'codebook') lists each variable contained on the data file, along with its address and such other information as frequencies and questionnaire text. The third file contains a keyword index to aid users in locating variables pertaining to a particular subject.

PB80-204134 PC A04/MF A01
Westat, Inc., Rockville, MD. Research Div.
Users Guide for Public Use Tapes CLMS-1 (Continuous Longitudinal Manpower Survey) and CLMS-2.
Interim rept. Jan 75-Jun 76.
Jul 80, 68p DOL/DF-80/001B, MEL-80-X-6
Contract DL-23-24-25-07
For system on magnetic tape, see PB80-204118. See also PB80-204126.

The Users Guide is part of the documentation sent to purchasers of the CLMS-1 and CLMS-2, the first two public use tape files produced as part of the Continuous Longitudinal Manpower Survey (CLMS). The Users Guide contains information about the CLMS data tapes to aid purchasers in their use. The CLMS is the major data development effort of the U.S. Dept. of Labor for evaluation of the decentralized employment and training programs funded under the Comprehensive Employment and Training Act (CETA). The public use files contain microdata on sampled enrollees who entered CETA programs during January 1975-June 1976. The data on the files was derived from three sources: CETA prime sponsor records; a series of up to four personal interviews with the sampled individuals; and the earnings records of the Social Security Administration (SSA). Data obtained through the sequence of interviews includes: labor force experience for the period beginning one year prior to CETA entry and extending up to three years after entry, basic demographic characteristics, a history of public benefits recipiency, and selected variables on family composition and income.

PB80-206139 PC E04/MF E04
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Migration and Settlement: 5. Netherlands.
Final rept.,
Paul Drewe. c1980, 84p RR-80-13
Prepared in cooperation with Technische Hogeschool, Delft (Netherland). Dept. of Architecture and Urban Planning.

In 1965, it was estimated that the population of the Netherlands in the year 2000 would be 20 million. Eleven years later this estimate had dropped to 14.3 million. The country is going through a process of vital transition marked by a decline in birth rates, though the extent of future fertility decline is still uncertain. Despite the fact that fertility has dropped below replacement level from 1973 onward, the Dutch population, being rather young, has a built-in momentum for future growth. Whether international migration will continue to contribute to population growth is highly uncertain. Recent estimates vary between net immigration and net emigration. (Copyright (c) 1980, International Institute for Applied Systems Analysis.)

PB80-206675 PC A02/MF A01
Brill (William) Associates, Inc., Annapolis, MD.
Household Safety and Security Survey.
Oct 79, 22p HUD-0001489
Contract HUD-H-2249R
See also Assessing the Social Environment, PB80-206683.

This manual, the third in a series on comprehensive security planning for public housing, is an introduction to two survey instruments for assessing the crime problem. The surveys, are designed to provide information about the extent of crime in public housing, the fear of being victimized, and the degree to which people alter their behavior as a result of fear. The surveys, have been field-tested in numerous public housing projects, and are essential for a comprehensive public housing security program. Correctly administered, they will provide project managers with valuable information on the nature of the crime problem.

PB80-206683 PC A02/MF A01
Brill (William) Associates, Inc., Annapolis, MD.
Assessing the Social Environment.
Oct 79, 22p HUD-0001474
Contract HUD-H-2249R
See also Planning for Housing Security, PB80-206675.

This manual, fourth in a series on housing security, presents criteria that can be used to assess the extent to which the social environment affects security in public housing sites. A methodology is presented for the assessment of the social environment at three levels: resident social relations, management services, and social services. The need to create a neighborhood has emerged from numerous studies as a vital factor in the security of residential housing. The analysis of resident social relations is based on the amount of social cohesion present in the project, attitudes of residents toward each other, the friendship patterns that exist, resident household composition, and the strength of resident organizations. An analysis of the scope of management services considers resident participation in management decisions and the degree to which staff has been trained to identify with residents and serve their needs. The examination of the available social services first assesses their general contribution to the sense of community and the self-help efforts of the residents and then focuses on specific assistance from drug and alcohol abuse services, which are likely to have the greatest impact on security. An outline for the preparation of solutions stresses resident consensus and participation and the linkage necessary to connect social services with the users who need them.

PB80-206741 PC A08/MF A01
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Housing and Urban Development (HUD) Housing Program Subsidy Model. Programmer's Manual,
David Einhorn. May 80, 156p HUD-0001498

The model structure description is intended to be used by HUD when it conducts its periodic examinations of the overall program subsidy costs of providing housing units under various subsidized housing programs and program combinations. These studies consider all direct and indirect costs, including tax revenues foregone to the Federal Government as a result of real estate tax subsidies and tax exempt financing, and local tax foregone where payments in lieu of taxes are less than local property taxes. The various components of cost are analyzed and aggregated for the initial year and projected ahead as cumulative costs for subsequent years.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A086 295/3 PC A02/MF A01
Texas Univ Health Science Center At Dallas
Inhibition of Human Peptidyl Dipeptidase (Angiotensin I Converting Enzyme: Kininase II) by Human Serum Albumin and Its Fragments.
Technical rept. 15 May 79-15 Aug 80,
Rainer J. Klauser, Carol J. G. Robinson, D. V. Marinkovic, and Ervin G. Erdoes. 1979, 11p Rept no. TR-18
Contract N00014-75-C-0807, Grant PHS-HL-16320
Pub. in Hypertension, v1 n3 p281-286 May-Jun 79.

No abstract available.

AD-A086 297/9 PC A02/MF A01
Texas Univ Health Science Center At Dallas
Inhibitors of Kininases.
Technical rept. 15 May 79-15 Aug 80,
Ervin G. Erdoes. 1979, 6p Rept no. TR-21
Contract N00014-75-C-0807, Grant PHS-HL-16320
Pub. in Federation Proceedings, v38 n13 p2774-2777 Dec 79. Presented at the Annual Meeting of the Federation of American Societies for Experimental Biology (63rd), Dallas, Texas, 4 Apr 79.

No abstract available.

AD-A086 298/7 PC A02/MF A01
Texas Univ Health Science Center At Dallas
Hydrolysis of Peptide Bonds and Control of Blood Pressure.
Technical rept. 15 May 79-15 Aug 80,
Ervin G. Erdoes, and T. A. Stewart. 1979, 14p Rept no. TR-23
Contract N00014-75-C-0807, Grant PHS-HL-16320
Pub. in Biological Functions of Proteinases, p260-268 1979.

No abstract available.

AED-Conf-76-172-010 PC A02/MF A01
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Application of exp 3 H-Labelled Silation Reagents to Determine the Kinetic and Equilibrium Constants of the Silylation Reactions for Mass Spectrometry of Steroid Hormones.
H. F. Struckmeyer. 1976, 12p CONF-7604108-7
In German.European meeting on biochemical and instrumental analysis in conjunction with the international exhibition analytica 76, Muenchen, F.R. Germany, 9 Apr 1976.
U.S. Sales Only.

Using the exp 3 H-labelled silation agents hexamethyl disilazane, trimethyl chlorosilane, and bis-(trimethylsilyl-) acetamide, the silation rate and efficiency of the silation of hydroxyl-substituted steroids was controlled. To determine the reactivity and specificity, 5d-androstane derivatives with defined keto- and hydroxyl groups were used. It was found that the silation process is best reproducible at room temperature. Steroid hormone silation is quantitative and reproducible with BSA, but less reproducible with HMDS and TMCS additives. The reaction rate increases with increasing amounts of TMCS, but a decomposition of the steroid hormones is observed at the same time. At a reaction temperature of 22 exp 0 C, the experiment proceeds optimally with regard to reaction rate and steroid loss due to decomposition. The silated steroids are stable. (Atomindex citation 09:370450)

INIS-mf-5184 PC A05/MF A01
Utrecht Rijksuniversiteit (Netherlands).
Nucleotide Sequence Analysis of Regions of Adenovirus 5 DNA Containing the Origins of DNA Replication.
P. H. Steenbergh. 30 Jan 79, 98p
Proefschrift (Dr.).
U.S. Sales Only.

The purpose of the investigations described is the determination of nucleotide sequences at the molecular ends of the linear adenovirus type 5 DNA. Knowledge of the primary structure at the termini of this DNA molecule is of particular interest in the study of the mechanism of replication of adenovirus DNA. The initiation- and termination sites of adenovirus DNA replication are located at the ends of the DNA molecule. (Atomindex citation 10:476662)

INKA-Conf-78-017-004 PC A02/MF A01
Zentralstelle fuer Atomkernenergie-Dokumentation (ZAED), Eggenstein-Leopoldshafen (Germany, F.R.).
Immunoglobulin Displacement of exp 125 I-Thyrotropin Bound to Human Fat Membranes.
D. Gill, and N. Marshall. 1978, 1p CONF-7809147-1
Annual meeting of the European Thyroid Association, Berlin, F.R. Germany, 4 Sep 1978.
U.S. Sales Only.

No abstract available.

PATENT-4 205 057 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Cerebrospinal Fluid Protein Fragments.
Patent,
John N. Whitaker. Filed 17 Jan 78, patented 27 May 80, 8p PB80-210958, PAT-APPL-870 090
Supersedes PB-279 293.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The isolation and use of cerebrospinal fluid myelin encephalitogenic protein (EP) fragments as an indicator of disease activity in multiple sclerosis is disclosed. With the use of a double-antibody radioimmunoassay, it was determined that a portion of EP cross-reacting with residues 43-88 (EP-PI) appears in the cerebrospinal fluid during periods of exacerbation.

PB80-200942 PC A02/MF A01
Columbia Univ., New York. Dept. of Biochemistry.
Biological and Synthetic Systems for Production of Hydrogen from Water.
Final rept. 1 Jun 75-31 Mar 80,
Alvin I. Krasna. Mar 80, 20p NSF/RA-800064
Grant NSF-PFR74-08381
See also report dated Mar 77-Feb 78, PB80-140 650.

The research study demonstrates the laboratory feasibility of producing hydrogen by biophotolysis of water. One method uses intact hydrogenase-containing algae capable of yielding large quantities of hydrogen in the presence of oxygen-removing agents. Reversible and irreversible oxygen absorbents have been developed to solve the problem of oxygen inhibition. Continuous methods for oxygen removal permit sustained large scale production hydrogen. Another biophotolysis scheme uses isolated plant chloroplasts coupled to hydrogenase or synthetic catalysts, with ferredoxin or methyl viologen as an electron carrier. Light acts on water to produce hydrogen in the presence of oxygen-removing systems. The anerobic reduction of the electron carrier by chloroplasts is the limiting factor in the process. Platinum and palladium catalysts can effectively replace hydrogenase in this coupled system. A number of synthetic systems have been developed to produce hydrogen from organic compounds in the presence of light and various photocatalysts. These methods constitute a non-polluting, alternate technology to produce hydrogen for fuel and as a chemical feedstock for fertilizer production.

UR-3490/LCP-17 PC A07/MF A01
Rochester Univ., NY. Dept. of Radiation Biology and Biophysics.
Fluorescence Quenching Studies of the Effects of Magnesium Ion, Glucose, Viscosity and pH on the Structure of Yeast Hexokinase Isozymes.
G. E. Norton. 1979, 129p
Contract EY-76-C-02-3490
Thesis.

Titrations of the tryptophan fluorescence of yeast hexokinase isozymes A and B (HkA and HkB) were performed with Mg exp 2+ , Li exp + , Na exp + , and K exp + ions as titrant in the absence and presence of glucose. Mg exp 2+ quenches the fluorescence of surface tryptophan by producing a conformational change which alters the microenvironment of the tryptophan. In the presence of glucose, Mg exp 2+ seems to quench more strongly, but the Mg exp 2+ enhances the glucose quenching by causing a conformational change which increases the glucose-binding constant. At pH 8.3 Na exp + , but not K exp + or Li exp + , has a small enhancing effect. Regardless of ionic strength, glucose binding by HkB is noncooperative at pH 8.3 in the presence of any of these four cations and at pH 5.5 in the presence of Mg exp 2+ or K exp + . Apparent negative cooperativity exists for glucose binding by this isozyme in the presence of Na exp + or Li exp + . Glucose binding to HkA in 0.02 M buffer exhibits positive cooperativity at pH 8.3 and 5.5. At pH 5.5 the degree of cooperativity is unchanged by any of these four cations at 0.03 ionic strength, while at pH 8.3 all four cations decrease the degree of cooperativity the same amount. Each cation enhances the glucose-binding strength of HkA at both pH's but to a greater extent at the higher pH. Titrations of the tryptophan fluorescence of HkB were performed with acrylamide as titrant. Acrylamide quenches 100% of the HkB fluorescence at 350 nm. The four tryptophan residues of the monomer subunit can be classified as two surface residues, a glucose-quenchable cleft tryptophan, and a partially buried tryptophan. Binding of the substrate glucose and the cofactor Mg exp 2+ induces conformational changes, which are accompanied by alteration of the exposure of the four tryptophans to the quenching action of acrylamide. Acrylamide titrations in the presence of glycerol suggest that transient channels may allow quencher to diffuse to the interior protein matrix. (ERA citation 05:010606)

6B. Bioengineering

PAT-APPL-6-092 102 PC A02/MF A01
Department of Health, Education, and Welfare, Washington, DC.
Polymer Alloy Blood Compatible Surface and Method of Making Same.
Patent Application,
William S. Pierce, and James Howard Donachy.
Filed 7 Nov 79, 14p PB80-208663
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A blood contacting layer and a blood contacting interface consisting of a solvent cast polyurethane alloyed with a filler-free silicone rubber. In the above, the alloy interface comprises an interpenetrating polymer network consisting of polyurethane and filler-free silicone rubber at the molecular level. The process or method of making the layer consists of preheating a metal mold such as an aluminum mold and filling it with a wax. After the wax form is removed, polished and cleaned, it is dipped first in a filler-free silicone rubber which is cured. It is then dipped in segmented polyurethane with curing of 150F for about one hour to evaporate the polyurethane solvent. Multiple dips are utilized up to 5 or 7 for implementing the polyurethane. The form containing both silicone rubber and polyurethane is finaly cured for a day or 24 hours at about 150F and the wax form is removed. Finally, the silicone rubber lining is removed, leaving the binary alloy blood contacting surfaced polyurethane sac.

PAT-APPL-6-141 676 PC A02/MF A01
Department of Health, Education, and Welfare, Washington, DC.

Microtome with Refrigerant Container for Cooling Paraffin Blocks during Sectioning.
Patent Application,
Filippina Giacometti, and Barbara Winterrowd.
Filed 18 Apr 80, 13p PB80-208713
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to microtomes of the type provided with means to cool the tissue block, and more particularly to a microtome including a cooling aparatus which provides constant uniform cooling of a tissue-containing paraffin block during cutting and which employs a conveniently renewable cooling agent.

PAT-APPL-6-148 491 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Apparatus and Method for Continuous Countercurrent Extraction and Particle Separation.
Patent Application,
Yoichiro Ito. Filed 9 May 80, 21p PB80-208671
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention relates to continuous contercurrent extraction devices and to continuous particle separation devices, and more particularly to an elution method and apparatus for continuous countercurrent chromatography and blood separation using a rotating coiled tube or conduit in an acceleration field.

PATENT-4 200 110 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Fiber Optic pH Probe.
Patent,
John I. Peterson, and Seth R. Goldstein. Filed 28 Nov 77, patented 29 Apr 80, 5p PB80-210990, PAT-APPL-855 384
Supersedes PB-278 392.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A fiber optic pH probe suitable to be implanted in tissue for physiological studies is disclosed. The probe includes an ion permeable membrane envelope which encloses the ends of a pair of optical fibers. A pH sensitive dye indicator composition is present within the envelope. The probe operates on the concept of optically detecting the change in color of a pH sensitive dye.

PATENT-4 209 860 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
System and Method for Multifunctional Control of Upper Limb Prosthesis via EMG Signal Identification.
Patent,
Daniel Graupe. Filed 13 Feb 78, patented 1 Jul 80, 11p PB80-211006, PAT-APPL-877 379
Supersedes PB-279 352.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system for controlling the operation of an electrically powered prosthetic appliance which replaces an amputee's missing limb. The method employed consists of conducting electromyographic (EMG) signals from the stump of the missing limb and processing the signals so as to reduce them to a near minimum number of linear time series model parameters effective to differentiate between each of the several functions performed by the missing limb from each other function thereof. A filter array carried by the amputee subsequently employs the identified parameters such that each individual filter of the array is tuned according to a set of parameters related to one of the limb functions considered.

6C. Biology

AD-A086 672/3 PC **A02**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Incorporation of Cadmium into Drosophila,
Lanna Cheng. 1980, 7p
Contract N00014-75-C-0152, Grant NSF-OCE76-10786
Pub. in Environment Pollution (Series a), v21 p85-88 1980.

No abstract available.

AD-A086 699/6 PC **A02**/MF **A01**
Wayne State Univ Detroit MI Dept of Biological Sciences
Contributions of Membrane Components to Intracellular Water Order: Research Summary.
Annual rept. no 3. (Final), 1 Oct 78-30 Sep 79,
Philip D. Morse, II. 9 Jun 80, 15p
Contract N00014-76-C-1167

This report is a summary of results obtained by our studies of the internal viscosity of red blood cells and spinach thylakoids as observed by electron paramagnetic resonance techniques. Specific detail considers the individual efforts on each of these cell systems, the difficulties in making these measurements, and conclusions based on the results in light of the difficulties. In addition, a discussion on the measurement of the rotational motion of spin labels in phospholipid vesicles is presented as well as a discussion on the applicability of measuring translational diffusion by measuring spin label collision frequency. The conclusion of the report is that although there are problems in interpretation of the measurements, internal viscosity of cells can be measured reliably by the spin label method. (Author)

AD-A086 853/9 Not available NTIS
Naval Biosciences Lab Oakland CA
Unique Midgut Basal Lamina in the Mosquito, Aedes Dorsalis (Meigen) (Insecta: Diptera).
Scientific note,
E. J. Houk, R. E. Chiles, and J. L. Hardy. 16 Jan 80, 4p
Availability: Pub. in International Jnl. of Insect Morphology and Embryology, v9 p161-164 1979 (No copies furnished by DTIC).

No abstract available.

IAEA-R-1012-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Use of Nuclear Techniques for Mutation and Selection of Fungi for High Protein Yield Utilizing Carbon from Inexpensive Agricultural Waste. Final Report for the Period 1 April 1971--30 September 1976.
S. Georgopulos. Dec 76, 6p
U.S. Sales Only.

The report briefly describes work carried out on the following subjects: Determination of protein in fungal strains (including Fusarium and Aspergillus niger); induction and selection of mutants (Aspergillus niger) giving higher yields of biomass and/or higher protein content; ability of fungi (Candida tropicalis) to utilize water extracts of carob bean pods; growth of Fusarium monoliforme at the expense of carob sugars; the use of alternate oxidase-negative mutants (of Ustilago maydis), for better utilization of substrates for growth (electron transport pathways in reoxidation of reduced coenzymes); kinetics of batch and continuous cultivation of Fusarium moniliforme (cultivated on aqueous carob extracts). (Atomindex citation 09:411013)

IAEA-R-1494-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Nitrogen Metabolism in Plants Using 15N as Tracer. Part of a Coordinated Programme on the Use of Isotopes in Fertilizer Efficiency Studies on Grain Legumes. Final Report for the Period 1 May 1974--14 December 1977.
J. Pate, and C. Atkins. Jan 78, 36p
U.S. Sales Only.

Techniques are described for studying the economy of carbon and nitrogen in annual nodulated legumes. Budgets for utilization of net photosynthate are constructed for cowpea (Vigna unguiculata (L) Walp.) and white lupin (Lupinus albus L.), including expenditure in respiration and dry matter accumulation of plant parts, carbon consumption in growth, respiration and export of fixed nitrogen by nodules, and the provision of recent photosynthate and earlier-fixed carbon to fruits. Sources of nitrogen to fruits are defined, and efficiencies of conversion of net photosynthate to protein of aboveground vegetative parts and of seeds are computed. Consideration is given to the timing of events associated with loss of symbiotic activity after flowering. Literature giving estimates of the respiratory requirements of nitrogen fixation by nodules is reviewed. Rates of respiration of nodules of cowpea, white lupin and pea (Pisum sativum L.) are assessed from a theoretical viewpoint, basing the estimates on ATP requirements for assimilation of N sub 2 into nitrogenous solutes, and published values for respiration costs in plant tissues. Expressed as CO sub 2 output per unit of nitrogen assimilated, these estimates greatly exceed the experimentally-observed CO sub 2 efflux of nodules of the species. This discrepancy is examined in relation to the capacity of nodules to fix CO sub 2 and the uncertainty of the in vivo requirement of nitrogenase for ATP. (Atomindex citation 10:437184)

IAEA-215 PC **A07**/MF **A01**
Breeding Vegetable Crops for Resistance to Insect Pests.
P. Nath. 1978, 126p CONF-7710206-
Advisory group meeting on the use of induced mutations for resistance of crop plants to insects, Dakar, Senegal, 17 Oct 1977.
U.S. Sales Only.

The paper reviews the work done on resistance of various vegetable crops (excluding potato and sweet corn) to common insect pests (excluding mites) in different countries. Results on source of resistance to melon aphid, striped and spotted cucumber beetles, squash bug, squash borer, pickleworm, red pumpkin beetle, fruit fly in different cucurbits; to cabbage maggot and aphid in cabbage; to aphid in spinach; to fruit and shoot borer and stem borer in brinjal; to jassids in okra; to jassid, bean weevil, mexican bean beetle, potato leaf hopper, melon fly in different beans; to pea aphid, pea weevil in pea; and to leaf miners, flea beetle, fruitworm, Drosophila in tomato have been high-lighted. Genetic basis of insect resistance has been reported to be monogenically dominant in muskmelon to melon aphid and in pumpkin and watermelon to fruit fly, whereas, additive gene action have been reported for resistance to both striped and spotted cucumber beetles and squash bug in squash. In interspecific crosses of muskmelon with wild melon 2 pairs of complimentary genes are reported to be involved for resistance to fruit fly. Maternal influence has also been indicated in intervarietal crosses of squash for resistance to spotted cucumber beetle. Breeding methods involving conventional as well as induced mutations have been discussed. (Atomindex citation 10:441263)

N80-27985/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Biological and Aerodynamic Problems with the Flight of Animals.
E. V. Holst, and D. Kuchemann. May 80, 37p
NASA-TM-75337
Contract NASW-3198
Transl. Into English from die Naturwissencchaften (Geottigen, Germany, F.R.), V. 24/25, 13 Jun. 1941 p 348-362. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Biological and aerodynamic considerations related to birds and insects are discussed. A wide field is open for comparative biological, physiological, and aerodynamic investigations. Considerable mathematics related to the flight of animals is presented, including 20 equations. The 15 figures included depict the design of bird and insect wings, diagrams of propulsion efficiency, thrust, lift, and angles of attack and photographs of flapping wing free flying wing only models which were built and flown.

N80-27986/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.

The Growth of Birdwings.
K. Meunier. May 80, 46p NASA-TM-75821
Contract NASW-3199
Transl. Into English from Leipzig Abetilung, (Germany, D.R.), V. 161, No. 3-4, 1959 p 444-482. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By State Bird Protection Station. Schleswig-Holstein, (Germany, F.R.).

Growth and order allometry is defined and applied to the growth of bird effects of negative wing allometry discussed with regard to body size and flight power. Transposition and evolutionary significance are explained.

PATENT-4 200 689 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Method of Cell Culture Using a Dual Circuit, Woven Artificial Capillary Bundle.
Patent,
Richard A. Knazek, Pietro M. Gullino, and David S. Frankel. Filed 29 Aug 78, patented 29 Apr 80, 8p PB80-210925, PAT-APPL-937 762
Supersedes PB-291 355.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is a method for cell culture using an artificial capillary cell culture device having two separate perfusion circuits, and with the ultrafiltration fibers of the two circuits being woven into a single bundle. The present device provides a matrix for high density growth of cultured cells in a continuous perfusion system. The device is particularly well adapted for the use of pressure differences between perfusion circuits, such as in the simulation of lymphatic drainage.

PATENT-4 206 015 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Method of Simulation of Lymphatic Drainage Utilizing a Dual Circuit, Woven Artificial Capillary Bundle.
Patent,
Richard A. Knazek, Pietro M. Gullino, and David S. Frankel. Filed 29 Aug 78, patented 3 Jun 80, 7p PB80-210917, PAT-APPL-937 761
Supersedes PB-291 359.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is a method for simulation of lymphatic drainage using artificial capillary cell culture device having two separate perfusion circuits, and with the ultrafiltration fibers of the two circuits being woven into a single bundle. The present device provides a matrix for high density growth of cultured cells in a continuous perfusion system. The device is particularly well adapted for the use of pressure differences between perfusion circuits.

PB80-201395 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Chesapeake Bay Inst.
A Review of the Current Status of the American Shad '(Alosa sapidissima)' in the Susquehanna River.
Special rept.,
Bruce D. Sidell. Feb 79, 50p CBI/SR-70, REF-79-1
Sponsored in part by Maryland Dept. of Natural Resources, Annapolis. Power Plant Siting Program.

During the last two hundred years there has been a dramatic and sustained decline in the American shad fishery of the Susquehanna River. Among the explanations most often advanced for this decline are overfishing, both in the Chesapeake Bay and in the river itself; construction of dams (canal-feeder and hydro-electric) or other obstructions to passage of anadromous fishes; and deleterious effects on water quality caused by mining wastes, sawmill pulp wastes, municipal sewages and increased agricultural activity in the watershed leading to fluctuations in flow characteristis of the river. This report attempts to answer these questions.

PB80-201791 PC **A15**/MF **A01**
National Marine Fisheries Service, Washington, DC.
Tapeworms (Cestoda, Ligulidae) of the Fauna of the USSR,
M. N. Dubinina. c1980, 336p TT-79-52028
Trans. of mono. Remnetsy (Cestoda, Ligulidae) Fauny SSSR, Moscow, Leningrad, 1966. Sponsored in part by Natinal Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The tapeworms of the family Ligulidae are of great significance for the fishing industry. In the larval, plerocercoid, phase they are widespread and dangerous parasites of many fish, primarily carp (Cyprinidae), causing massive epizootic ligulosis and resulting in significant economic loss to the nation's fishing industry each year. The book is meant for fishery biologists and parasitologists as well as those interested in epizootics.

PB80-201882 PC **A03**/MF **A01**
Neushul Mariculture, Inc., Goleta, CA.
Experimental Macroalgal Mariculture.
Quarterly rept. 1 Jan-31 Mar 80.
1980, 27p NSF/RA-800065
Grant NSF-PFR79-11715

This report describes progress in the development of methods for the commercial cultivation of marine macroalgae. Attention focused on those species of algae having the highest present potential for commercial use. Increased understanding of the life cycles of algae has stimulated research in commercial seaweed farming to produce algae on a large scale. This experimental project was conducted in the coastal waters off southern California. The research procedures used were those normally employed at an agricultural experiment station: documenting environmental conditions; designing and building farm structures; collecting, propagating, weighing, growing, culling, and analyziNg various plants; and performing field-test experiments. The study analyzed problems of providing seed-stock, substratum, and nutrients to a shallow-water marine farm. Marine farm structures were designed using a plastic, agricultural irrigation pipe which acts as a planting substratum and vehicle for nutrient irrigation.

PB80-202179 PC **A06**/MF **A01**
Smithsonian Institution, Washington, DC.
Larus, Volume 25, 1973.
1973, 112p TT-74-56001
Trans. of Larus (Yugoslavia) v25 p5-28 1973, by Margaret Casman and France Stropnik. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Contents:
Bird banding in 1970;
A review of the biotopes of the species of Emberiza cia L. in western parts of Yugoslavia;
Data on the winter population of the bean-goose, anser fabalis in northern Yugoslavia and Hungary;
The distribution and population size of the grey lag-goose anser anser in Yugoslavia;
Contribution to the knowledge of the avifauna of the mountain region of Maglic, Volujak and Zelengora;
Recent spread of the Spanish sparrow, Passer h. in Romania;
Ornithological observations in Bulgaria during July 1971;
A contribution to the knowledge of the diet of barn-owls, tyto-alba.

PB80-202351 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
Kansas Leeches (Annelida: Hirudinea) With Notes on Distribution and Ecology.
Journal article,
Donald J. Klemm, Donald G. Huggins, and Mark J. Wetzel. 1979, 12p EPA-600/J-79-096
Pub. in Technical Publ. State Biological Survey, Kansas, v8 p38-46 1979.

In comparison to the other aquatic macroinvertebrate groups of Kansas, the leech fauna is an unusually neglected group. This preliminary survey of Kansas leeches include 20 species, 13 of which are new to this state.

PB80-202369 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
A New Species of Leech, 'Batracobdella cryptobranchii' n. sp. (Annelida: Hirudinea), Parasitic on the Ozark Hellbender.
Journal article,
Guy M. Johnson, and Donald J. Klemm. 1977, 8p EPA-600/J-77-176
Pub. in Transactions of the American Microscopical Society, v96 n3 p327-331 Jul 77. Prepared in cooperation with Milwaukee Public Museum, Wi. Dept. of Invertebrate Zoology.

Batracobdella cryptobranchii, parasitic on Ozark Hellbenders, Cryptobranchus alleganiensis, is found in the North Fork of the White River, Ozark County, in Missouri. B. cryptobranchii reaches a length of 17 mm; dorsum is smooth; color pattern or metameric markings are absent. The anus opens dorsally with two postanal annuli. Caudal sucker is circular, directed ventrally, and is distinct from the body on a very short pedicel.

PB80-202872 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Texas Panhandle Pheasants: Their History, Habitat Needs, Habitat Development Opportunities, and Future.
Forest Service general technical rept. (Final),
Fred S. Guthery, Jay Custer, and Mike Owen. Jul 80, 17p FSGTR/RM-74
Prepared in cooperation with Texas Tech Univ., Lubbock.

Pheasants (Phasianus colchicus) colonized the Texas Panhandle in the late 1930's. Panhandle habitat is deficient in travel lanes, secure nesting cover, and over-winter cover. The high value of cropland limits habitat development, but cover plantings may be feasible on idle areas. Aquifer depletion will probably decrease pheasant populations in the future.

PB80-202971 PC **A09**/MF **A01**
North Carolina State Univ. at Raleigh. Sea Grant Coll. Program.
Hangs and Obstructions to Trawl Fishing, Atlantic Coast of United States,
James A. McGee, and R. Hughes Tillett. Dec 79, 191p UNC-SG-79-04, NOAA-80060903

An expanded revision is presented of a log of hangs and obstructions to trawl fishing first published in 1975, in an effort to make known to commercial fishermen locations of objects on ocean bottom that would hang or snag tawling gear and nets. It consists of a collection of information from trawler captains who were willing to share their hang logs with others and locate hangs mainly off Virginia, North Carolina, South Carolina, and Georgia. This hang log attempts to provide as many LORAN cross bearings as possible. Also, the LORAN A readings were converted, when possible, to LORAN C. LORAN A is scheduled to cease operation at the end of 1980.

PB80-203284 PC **A11**/MF **A01**
California Univ., Santa Cruz. Center for Coastal Marine Studies.
Pathogens of Marine Plants.
Special pub.,
Lynda J. Goff, and Julia C. Glasgow. Feb 80, 243p SP-7, NOAA-80060301
Grant NOAA-04-6-158-4410

In compiling the bibliography, the authors have considered both biological (i.e., viruses, bacteria, algae, fungi, protozoa, nematodes and copepods) and non-biological (i.e., oil, detergents, biocides, thermal pollution, sewage, heavy metals, radio-nuclides, and several physical factors) causative agents of diseases in marine plants. A list of key words was developed for each citation and these are included (along with a program entry number) in the bibliography. The entire bibliography has been entered into a literature retrieval program (PDP BASIC PUSSER Program) that was developed for this study. This program was used to develop topic bibliographies dealing with specific dis-

ease problems, the diseases that affect specific economically important marine algae, and each causative agent of disease. These topic bibliographies follow the general bibliography and have superficially summarized the available information.

PB80-203474 PC **A04**/MF **A01**
Alaska Dept. of Fish and Game, Juneau.
Shellfish Investigations in Lower Cook Inlet.
Completion rept. Jul 76-Jun 79,
Allen S. Davis. May 80, 68p NOAA-80060401

The man project objective of the lower Cook Inlet shellfish study was to assess king (Paralithodes camtschatica) and Tanner crab (Chionoecetes bairdi) populations, and to a lesser degree, Dungeness (Cancer magister) stocks. Detailed results of the 1979 index pot fishing are presented with comparative summary information from previous years sampling.

PB80-204423 PC **A04**/MF **A01**
Rhode Island Univ., Narragansett.
Salmon Culture in Water Reuse Systems: An Economic Analysis,
J. M. Gates, C. R. MacDonald, and B. J. Pollard. Jan 80, 51p URI-MTR-78, NOAA-80061005
Grant NA79AA-D-0096

In recent years, scientists have adapted water reuse technology for use in fish culture. The resulting systems are experimental at this time and still evolving. The emphasis of this paper is on optimizing use of fixed plant and evaluating the effects of selected technical or scientific advances on profitability. Conceptually, water reuse systems have three advantages. By stabilizing the environment, more productive strains can be selected. Since the system can be nearly closed, access by pathogens and predators can be controlled. It is also possible to select and maintain any desired culture temperature, since more than 90% of the culture water is recirculated rather than discharged. The economic questions which this technology poses for the commercial fish culturist are: How can the capabilities of such a system be used to best economic advantage, and Are the resulting gains sufficient to justify the substantial capital investment required by a water reuse system.

PB80-204712 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
A Review of the Leeches (Annelida:Hirudinea) in the Great Lakes Region.
Journal article,
Donald J. Klemm. 1977, 24p EPA-600/J-77-173
Pub. in Michigan Academician, v9 n4 p397-418 1977.

The leeches of the Great Lakes region compose a significant part of the North American freshwater fauna in numbers of species (43 taxa) and are considered biologically important as parasites and predators. This report presents the taxonomy and identification of these for the Great Lakes Region.

PB80-205776 PC **A02**
National Marine Fisheries Service, Highlands, NJ. Sandy Hook Lab.
Relation of Biological and Environmental Factors to Soft-Shell and Hard-Shell Clam Management,
Clyde L. MacKenzie, Jr. 1978, 15p NOAA-79120710
Pub. in Proceedings of Northeast Clam Industries, Management for the Future held at Hyannis, Massachusetts on April 27-28, 1978, p67-78.

The hard-shell and soft-shell clams have large enough biotic potentials, or sum of maximum physiological reproductive, survival, growth, and longevity capacity of clams to stock beds with dense clam populations. Yet, clam abundance is usually too low in beds to support prosperous fisheries. The reason for low clam abundance is that environmental factors in beds are not optimal in terms of predator density, and perhaps setting surfaces for larvae. This paper describes (1) biotic potential of clams; (2) environmental requirements of clam populations; (3) environmental factors that suppress the biotic potential of clams; and (4) possibilities for increasing abundance of clams by means of predator reduction.

PB80-207558 PC **A07**/MF **A01**
Maryland Dept. of Natural Resources, Annapolis. Energy and Coastal Zone Administration.
Maryland's Chesapeake Bay Commercial Fisheries,
Mark M. Bundy, and John B. Williams. Nov 78, 135p NOAA-80061210
Prepared by Development Sciences, Inc., Sagamore, MA.

Results from a field interview study conducted around the Maryland Chesapeake Bay shore are reported. It represents a concensus of opinions held by those interviewed (government officials, industry spokesmen, and watermen) rather than an interpretation and evaluation of data collection and analysis. The Maryland fisheries described and characterized have been limited to Chesapeake Bay commercial fisheries for oysters, soft-shell clams, blue crabs, and finfish. The Bay habitat itself is described, followed by descriptions of fishing community framework, the harvesting sector, the shoreside support and sale system, and the institutional framework affecting Bay commercial fisheries.

PB80-208796 PC **A03**/MF **A01**
National Marine Fisheries Service, Washington, DC. Fisheries Development Div.
Food Fish Market Review,
Richard K. Kinoshita. May 80, 49p CEA-F-30, NOAA-80061212

Consumption of most finfish products slowed or declined in 1979 as the summer fuel shortage, lower chicken and pork prices, and a drop in real consumer purchasing power affect sales. Except for a couple of products, supplies were adequate, and did not present any real problems. Wholesale prices for most products advanced 7 to 12% from 1978. At the retail level, prices for fishery products rose 14% in 1979, and generally kept pace with inflation. The most significant event in 1979 was the 1/3 increase in landings of salmon, and the strong export demand from frozen and canned salmon. Consumption of canned salmon and fillets of flounder, ocean perch and turbot declined; while consumption of fish sticks, and portions, and canned tuna was practically unchanged from 1978. Only consumption of cod and haddock fillets increased. A 1/3 increase in landings of salmon greatly enhanced the supply of frozen salmon.

PB80-208804 PC **A03**/MF **A01**
National Marine Fisheries Service, Panama City, FL. Panama City Lab.
Results of a King Mackerel ('Scomberomorus cavalla') and Atlantic Spanish Mackerel ('Scomberomorus maculatus') Migration Study, 1975-79.
Technical memo.,
Doyle F. Sutherland, and William A. Fable, Jr. Mar 80, 27p NOAA-TM-NMFS-SEFC-12, NOAA-80061305

The Panama City and Port Aransas Laboratories tagged and released 2,731 king and 745 Atlantic Spanish mackerel in a 1975-78 study of their governments and migration. From those releases, 59 (2.2%) of the king mackerel and 44 (5.9%) of the Atlantic Spanish mackerel were subsequently recaptured. The tagged recoveries revealed an annual migration by king mackerel from south Florida waters north to the northeast coast of the Gulf of Mexico and west to south Texas waters in the spring and return to south Florida in the fall. Mixing of Gulf fish in the winter with Atlantic fish north to Ft. Pierce was disclosed by tagged recaptures.

PB80-209463 PC **A02**/MF **A01**
Environmental Research Lab.-Duluth, MN.
Effects of Temperature on Hatching Success and Survival of Larvae in the White Bass.
Journal article,
J. Howard McCormick. Oct 78, 7p EPA-600/J-78-092
Pub. in Progressive-Fish Culturist, v40 n4 p133-137 Oct 78.

Temperature effects on the hatching success of eggs of the white bass (Morone chrysops) were determined by exposing sample lots of recently fertilized eggs to 10 constant temperatures, 6 through 30C. Different lots of eggs were exposed to test temperatures before gastrulation, and after closure of the blastopore in the embryo. The percentages of normal larvae hatched were not significantly ($P > 0.05$) impaired in eggs exposed before gastrulation at temperatures from 18 through 26C, nor in those first exposed after closure of the blastopore at temperatures from 14 through 26C. Eggs incubated in 14C hatched 4.5 days after fertilization, and those incubated at 26C required only 1 day. The 24-h TL50 for white bass larvae exposed within 24 h of hatching and acclimated to 14, 18, 20 and 26C was between 30 and 32C, and was not altered by the acclimation temperatures tested.

PB80-929905 PC$6.00/MF$3.00
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Selected Aspects of Enzymes in Cancer.
Special listing.
14 Jul 80, 89p NCI/ICRDB/SL-345
Supersedes NTISUB/E/299-007.

This Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Isolation, characterization, and regulation of enzymes of nucleic acid and nucleotide metabolism in cancer cells; Isolation, characterization, and regulation of enzymes of protein metabolism in cancer cells; Isolation, characterization, and regulation of enzymes of carbohydrate, lipid, steroid, folate, and other metabolism in cancer cells; Phenotypic expression as enzyme activities and enzyme induction in cancer cells; Histochemical localization of enzyme activities in cancer cells and tissues.

PNL-2713 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Shrub-Inhabiting Insects of the 200 Area Plateau, Southcentral Washington.
L. E. Rogers. Oct 79, 55p
Contract EY-76-C-06-1830

This study characterizes the insects (including spiders) associated with major shrubs of the 200 Area Plateau on the Hanford Site in southcentral Washington. Big sagebrush (Artemisia tridentata), rabbitbrush (Chrysothamnus sp.) and hopsage (Grayia spinosa) were the three shrubs included in the study. Hemiptera (true bugs) and homoptera (bugs) were the two groups most abundant on sagebrush. Homoptera and Araneida (spiders) were the common inhabitants of rabbitbrush, and Orthoptera (grasshoppers), Coleoptera (beetles), and Araneida the taxa most frequently collected from hopsage. A discussion of the effects of insects on western native shrubs is included. None of the insect populations appeared to threaten the stability of shrub stands, which is important because of the erodability of 200 Area soils. (ERA citation 05:006166)

RLO-2221-T2-44 PC **A02**/MF **A01**
Washington State Univ., Pullman.
Nature and Mechanism of Induction of Mutations. Annual Progress Report, August 1, 1978-August 1, 1979.
R. A. Nilan, A. Kleinhofs, and C. F. Konzak. 1 Aug 79, 18p
Contract EY-76-C-06-2221-002

The isolation and partial characterization of the mutagenic azide metabolite was accomplished. This accomplishment is unique in plant mutagenesis studies and has been infrequently accomplished in animal or bacterial mutagenesis studies. The metabolite appears to be an organic azide. Experiments, using a newly developed uvr exp - B. subtilis strain, confirmed our earlier results that azide is not mutagenic in vitro. Similar experiments with the metabolite were also negative. Thus it appears that the mechanism of action of azide and the metabolite is through DNA replication. Progress towards understanding the nature of the azide-induced mutations continues to be made. A preliminary map of the first six waxy locus alleles has been constructed. The azide-induced nitrate reductase-deficient mutants have been partly characterized. (ERA citation 05:001930)

UM-P-78/2 PC **A02**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Proton Activation Studies of Changes in Mineral Composition of Eucalyptus Obliqua Due to Phytophthora Cinnamomi.
M. A. Chaudri, M. M. Lee, J. L. Rouse, and G. Weste. 1978, 8p
U.S. Sales Only.

As part of a study of disease caused by Phytophthora cinnamomi in native vegetation, the mineral composition of diseased plants was compared with those free from disease, but grown under the same conditions. Young plants of Eucalyptus obliqua, three years old and with well-formed lignotubers, were selected (a) diseased plant from soil containing a high concentration of P. cinnamomi, and (b) unaffected plant from an adjacent area where the soil was free from this pathogen. The plants were ashed and their mineral composition was compared by activation analysis using proton beams from the Melbourne University Cyclotron. Results showed a 70% reduction in iron and 41% in titanium from diseased plants compared with disease-free plants. The reduction in iron is associated with severe chlorosis which occurs as a primary symptom in most plants attacked by this pathogen. (Atomindex citation 10:440304)

6D. Bionics

ED-178 060 Not available NTIS
Rand Corp., Santa Monica, CA.
Machine Methods for Acquiring, Learning, and Applying Knowledge,
Frederick Hayes-Roth. Oct 78, 84p RAND-p-6241
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from the RAND Corporation, 1700 Main Street, Santa Monica, CA. 90406 ($5.00 per copy).

A research plan for identifying and acting upon constraints that impede the development of knowledge-based intelligent systems is described. The two primary problems identified are knowledge programming, the task of which is to create an intelligent system that does what an expert says it should, and learning, the problem requiring the criticizing and expanding of current knowledge to improve overall system performance. In this view, learning produces new knowledge which must be accommodated to implement an improved system. Motivating problems, technical requirements for supporting system extensibility and improvability, and research proposed to achieve these objectives are described and related to previous research. Numerous examples are drawn for a heuristic program that plays a moderately difficult card game (hearts). Several appendices provide additional details on many technical issues, including the representation of knowledge and the structure of knowledge bases, the design of a knowledge programmer, various control methods, the design of a learning workbench, and illustrative learning scenario, and various learning heuristics.

6E. Clinical Medicine

AD-A086 353/0 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
United States Army Guidelines for Troop Living Space: A Historical Review,
Caroline G. Brodkey, and Joel C. Gaydos. 1980, 5p
Pub. in Military Medicine, v145 n6 p418-421 Jun 80.

No abstract available.

AD-A086 363/9 PC **A02**/MF **A01**
Rice Univ Houston TX
Nutritional Relationships in Schistosomiasis.
Final rept. 1 Mar 73-28 Feb 74,
Frank M. Fisher, Jr., and Clark P. Read. Jul 78, 11p Rept no. 414-1041
Contract DADA17-73-C-3068

Amino acids, sugars, purines, and pyrimidines enter the tegument of adult Schistosoma mansoni by both diffusion and mediated processes. In all examples, the mediated processes are specific, and demonstrate saturation kinetics as well as inhibition by closely related molecular species. The concentration of amino acids in mouse hepatic portal serum approximated the respective transport constants (K sub t) determined in vitro. Purines and pyrimidines also enter the adult parasite by both mediated and diffusion processes. Five distinct though complex transport loci were identified. Nucleotides are primarily dephosphorylated at the tegumental surface prior to permeation. The phosphodyrolase is not involved in the hydrolosis of sugar phosphates, nor is it (they) sensitive to Na+ for cysteine. Like the above organic solute, the sugars enter the parasite by a mixed mode--both diffusion and mediated systems being utilized. The mediated system is apparently Na+ dependent and sensitive to presence of ouabain, phlorizin, phloretin. Hexose mediated accumulation is Na+ coupled. (Author)

AD-A086 425/6 MF **A01**
Naval Health Research Center San Diego CA
NHRC Report for 1979.
1979, 122p OPNAV-5750-1
See also report dated 1978, AD-A069 075.
Availability: Microfiche copies only.

No abstract available.

AD-A086 438/9 PC **A02**/MF **A01**
Boston Univ MA School of Medicine
In Vivo Distribution of Cryogenically Preserved Guinea Pig Granulocytes,
F. J. Lionetti, S. M. Hunt, J. P. Schepis, A. J. Roy, and R. H. Liss. 21 Sep 79, 12p
Contract N00014-79-C-0168
Pub. in Cryobiology, v17 p1-11 1980. Prepared in cooperation with Alexandria Univ., (Egypt). Faculty of Medicine, Contract N00014-73-C-0010 and Arthur D. Little, Inc., Cambridge, MA Contract N00014-76-C-0489.

No abstract available.

AD-A086 447/0 MF **A01**
Egyptian Organization for Biological and Vaccine Production Agouza Cairo
Immunological Approach in Schistosomiasis.
Annual rept.,
Fatma Hassan, S. Seddik, A. Shetta, and A. Nousseir. Jun 79, 22p Rept no. 7
Contract N00014-75-C-0835
Availability: Microfiche copies only.

Study No. 1 with reference to our last report of 1978 immunization experiments with high doses of irradiation with Cobalt 60 are terminated and the study with its results are as follows. In a previous study a trial of inducing protection by Immunization of mice with low doses of cobalt 60 irradiated cercariae was carried out. The results were rather encouraging yet follow up of immunized animals failed to give satisfactory resistance to new infection.

AD-A086 454/6 PC **A02**/MF **A01**
Naval Dental Research Inst Great Lakes IL
Evaluation of the Navy Plaque Control Program, at Great Lakes.
Research program rept.,
M. R. Wirthlin, E. B. Hancock, R. G. Walter, and J. C. Cecil. Feb 80, 25p Rept no. NDRI-PR-80-01

A review of before/after changes in dental plaque and calculus deposits and the distribution and severity of periodontal diseases in subjects at a naval training center was conducted, and related to the preventive dentistry program. The subjects were naval recruits who continued training at the center for six months. They received significant short-term reductions of plaque and at the end of their training had an overall slight improvement in periodontal health as a result of the program. (Author)

AD-A086 480/1 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Dissociation: A Family Concept for Nurses,
Rosa Lee Cook. 1980, 4p Rept no. SAM-TR-78-341
Pub. in Military Medicine, v145 n5 p338-339 May 80.

No abstract available.

AD-A086 481/9 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Advanced Casualty Care Training using Animal Models.
Rept. for Oct-Dec 78,
Joel L. Mattsson, Francis Cadigan, and Robert Armstrong. 1980, 5p Rept no. SAM-TR-79-323
Pub. in Military Medicine, v145 n6 p401-404 Jun 80.

No abstract available.

AD-A086 512/1 PC **A08**/MF **A01**
Army Medical Bioengineering Research and Development Lab Fort Detrick MD
US Army Medical Research and Development Report.
Annual progress rept. 1 Oct 78-30 Sep 79,
John N. Albertson, Jr. 1 Oct 79, 170p

The Annual Progress Report, Fiscal Year 1979, summarizes research performed by the US Army Medical Bioengineering Research and Development Laboratory in projects authorized by The Surgeon General, US Army, and the Commander, US Army Medical Research and Development Command. Contents: Health Standards for Military Pollutants; Combat Medical Materiel (Military Medical Materiel, Exploratory Development); Combat Medical Materiel (Military Medical Materiel, Advanced Development); Combat Medical Materiel (General Combat Support, Engineering Development); and IN-House Laboratory Independent Research.

AD-A086 533/7 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Technique and Measurement of Heat Flux and Flame Temperature in Rocket Plume Exposures.
Final rept.,
J. R. Piergallini, and A. M. Stoll. 7 May 80, 12p Rept no. NADC-80093-60

An investigation was performed using model rocket static test engines simulating full scale rocket engine firings with instrumented live animals, heat flux transducers and thermocouples for burn injury assessments. Available data on rocket engine flame temperatures was either extrapolated or computed from chemical compositions and because of the unique 'dirty' characteristics of the flame, it was necessary to devise special instrumentation for direct measurements. A heat flux transducer was fabricated to measure the energy impingent upon the skin surface at various distances from the rocket engine. The transducer was calibrated against a graphite imaging furnace capable of producing 15 cal/sq cm sec, in conjunction with a standard radiation source and radiometer. Radiometric observations were used also to describe precisely the pulse shape of the rocket engine plume. External and intradermal thermocouples measured the actual temperatures experienced in producing a white burn in the rat (equivalent to a second degree burn in the human) and for monitoring each test and correlating one exposure with another. This paper describes the techniques and measurements used, the generation of a time-temperature profile for producing the standard burn effect and provides a temperature history at the level of the burn site.

AD-A086 635/0 PC **A02**/MF **A01**
Johns Hopkins Univ Baltimore MD Dept of Microbiology
Mechanism of Cytolysis by Lymphocytes: A Comparison with Complement.
Technical rept.,
M. M. Mayer. 1977, 11p
Contract N00014-75-C-0142, Grant NSF-BMS75-09911
Pub. in Jnl. of Immunology, v119 n4 p1195-1203 Oct 77. Presented at Meeting of American Association of Immunologists, Chicago, IL, 6 Apr 77.

No abstract available.

AD-A086 674/9 Not available NTIS
Johns Hopkins Univ Baltimore MD Dept of Microbiology
Life-Span and Size of the Trans-Membrane Channel Formed by Large Doses of Complement.
Louise E. Ramm, and M. M. Mayer. 30 Oct 79, 7p
Contract N00014-75-C-0142, Grant NSF-PCM77-16002
Availability: Pub. in Jnl. of Immunology, v124 n5 p2281-2287 May 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 686/3 PC **A03**/MF **A01**
Maryland Univ Baltimore Dept of Microbiology
Clinical and Epidemiological Studies on Rickettsial Infections.
Annual rept. 1979-1980,
Charles L. Wisseman, Jr. 1 Jun 80, 37p
Contract N00014-76-C-0393

Essentially all of our time this year was spent in research on the ecology of murine typhus, and the findings continue to support our hypothesis that this rickettsiosis deeply involves: (1) indoor commensal murines or other small mammals (therapihons) which behave as a peridomestic species, such as Suncus shrews; (2) their ectoparasites such as fleas, lice and perhaps mesostigmatid mites; and (3) hyperendemic minifoci or microfoci, wherein a large proportion of the commensal mammals and fleas and lice in a highly restricted locus, such as a single building (or even a rat-nest) are naturally infected with Rickettsia moseri, the etiological agent of murine typhys. The data from the continuing studies in Burma complement and extend our earlier investigations in Ethiopia.

AD-A086 755/6 PC **A02**/MF **A01**
Naval Dental Research Inst Great Lakes IL
The Problem of Occlusal Surface Pit and Fissure Dental Caries in Naval Recruits.
Research progress rept.,
M. R. Wirthlin, I. L. Shklair, R. G. Walter, J. C. Cecil, and M. E. Cohen. Jun 80, 12p Rept no. NDRI-PR-80-06

Dental caries has a high prevalence in naval recruits. This report of their condition presents data on the anatomic sites most caries-prone, the occlusal surface pits and fissures of the molar teeth. Work continues to identify the individuals most caries-prone. (Author)

AED-Conf-77-395-004 PC **A02**/MF **A01**
Mainz Univ. (Germany, F.R.).
Contribution to the Radiotherapy of Pinealomas: Course Controls by Computer Tomography.
E. Schindler, K. Kretzschmar, and A. Aulich. 1977, 6p CONF-7709129-5
In German.14. meeting of the deutsche gesellschaft fuer neuroradiologie, Koeln, F.R. Germany, 16 Sep 1977.
U.S. Sales Only.

The clinical course of a metastasising pinealoma was controlled in a 21-year old patient by computerized tomography. Possible diagnostic techniques, the diagnosis of the type of tumor, and its therapy are listed. (Atomindex citation 09:370503)

AED-Conf-77-395-006 PC **A02**/MF **A01**
Mainz Univ. (Germany, F.R.).
Diagnostic Value of Computerized Tomography for the Radiotherapy of Cerebral Tumors.
K. Kretzschmar, A. Aulich, E. Schindler, J. Kutzner, and S. Lange. 1977, 4p CONF-7709129-3
In German.14. meeting of the deutsche gesellschaft fuer neuroradiologie, Koeln, F.R. Germany, 16 Sep 1977.
U.S. Sales Only.

Course control of the radiotherapy of brain tumors by computerized tomography is described as an important diagnostic element using the example of three different groups of patients. In contrast to scintigraphy, encephalography, and serial angiography, computerized tomography enables fields of application to be determined in dependence of the tumor boundaries. (Atomindex citation 09:370479)

AED-Conf-77-461-008 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Mechanized Sephadex LH-20 Multiple Column Chromatography as a Prerequisite to Automated Multi-Steroid Radioimmunoassays.
W. G. Sippell, F. Bidlingmaier, and D. Knorr. 1977, 14p CONF-7710167-15
Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

In order to establish a procedure for the simultaneous determination of all major corticosteroid hormones and their immediate biological precursors in the same plasma sample, two different mechanized methods for the simultaneous isolation of aldosterone (A), corticosterone (B), 11-deoxycorticosterone (DOC), progesterone (P), 17-hydroxyprogesterone (17-OHP), 11-deoxycorticol (S), cortisol (F), and cortisone (E) from the methylene chloride extracts of 0.1 to 2.0 ml plasma samples have been developed. In both methods, eluate fractions of each of the isolated steroids are automatically pooled and collected from all parallel columns by one programmable linear fraction collector. Due to the high reproducibility of the elution patterns both between different parallel columns and between 30 to 40 consecutive elutions, mean recoveries of tritiated steroids including extraction are 60 to 84% after a single elution and still over 50% after an additional chromatography on 40cm LH-20 colums, with coefficients of variation below 15%. Thus, the eight steroids can be completely isolated from each of ten plasma extracts within 3 to 4 hours, yielding 80 samples readily prepared for subsequent quantitation by radioimmunoassay. (Atomindex citation 09:386250)

AED-Conf-77-461-015 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Investigation of the Specificity of Radioimmunological Dose of Procollagen Type I and Type II.
G. Heynen, J. A. Kanis, S. Gaspar, P. Franchimont, and M. Broux. 1977, 11p CONF-7710167-12, IAEA-SM-220/25
In French.Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

Bovine procollagen type I and II has strong antigenic properties. The method of radioimmunological dosage of these two polypeptides by a determination of their specificity is described. The application of this method in biology is illustrated by a few examples. (Atomindex citation 09:386226)

AED-Conf-77-461-016 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Evaluation of a Solid Phase RIA Technique and Solid Phase ELISA Technique for the Demonstration of Hepatitis B Surface Antigen.
R. Vranckx, J. Cole, and M. Peetermans. 1977, 15p CONF-7710167-16, IAEA-SM-220/27
Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

The authors compared the sensitivity of a solid phase radio-immunoassay (R.I.A.), a solid-phase enzyme-immunoassay (E.L.I.S.A.) and a hemagglutination test (R.P.H.A.) for the detection of the HBs Ag in two ways: 1) by screening a panel of 300 sera (97 positives and 203 negatives) and 2) by titrating serial dilutions of 10 positive sera. Ninety seven sera were positive by R.I.A., 95% were detected by E.L.I.S.A. and 81% were detected by R.P.H.A. In the serial dilutions the average end points of the titration were for R.I.A. 0.005 ng/ml, for E.L.I.S.A. 0,01 ng/ml and for R.P.H.A. 0.04 ng/ml. It can be concluded that the sensitivity of the E.L.I.S.A. test is intermediate between the sensitivity of the R.I.A. and the sensitivity of the R.P.H.A. The E.L.I.S.A. and the R.P.H.A. tests seam to be a little more sensitive for the detection of subtype ay than the detection of subtype ad. (Atomindex citation 09:386258)

AED-Conf-77-461-020 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Novel Radioassay for the Determination of Folate in Serum and Red Cells and New Observations on the Stability of Serum Folate.
E. P. J. Lynch, K. C. Tovey, and H. Guilford. 1977, 8p CONF-7710167-14, IAEA-SM-220/32
Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

A competitive protein binding assay for the determination of folate in serum and red cells has been developed. The assay has been fully validated in hospital trials and comparisons have been made with the microbiological assay. We have based the standardization of the radioassay on exp 15 Nb-methyltetrahydrofolate (exp 15 Nb-MTHF) as this is the predominant folate derivative in serum samples. At about pH 9.5 pteroylglutamic acid (PGA) and exp 15 Nb-MTHF demonstrate the same affinity for folate binding proteins. Therefore, many folate assays have adopted PGA largely because of the popular belief that exp 15 Nb-MTHF is highly unstable. However, we have demonstrated that exp 15 Nb-MTHF in serum standards is surprisingly stable at -20 exp 0 C. All the reagents for the assay (including the exp 15 Nb-MTHF standards) have shown perfectly acceptable stability, permitting their storage for at least three weeks at -20 exp 0 C and one week at 4 exp 0 C. Evidence will be presented to support the use of exp 15 Nb-MTHF as being the more appropriate standard. Folate in human serum samples is stable even at room temperature in the presence of 0.1% sodium azide. (Atomindex citation 09:386236)

AED-Conf-77-461-022 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Non-Linear Least Squares Curve Fitting of a Simple Theoretical Model to Radioimmunoassay Dose-Response Data Using a Minicomputer.
T. A. Wilkins, D. C. Chadney, J. Bryant, S. H. Palmstroem, and R. L. Winder. 1977, 16p CONF-7710167-17, IAEA-SM-220/36
Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

Using the simple univalent antigen univalent-antibody equilibrium model the dose-response curve of a radioimmunoassay (RIA) may be expressed as a function of Y, X and the four physical parameters of the idealized system. A compact but powerful minicomputer program has been written in BASIC for rapid iterative non-linear least squares curve fitting and dose interpolation with this function. In its simplest form the program can be operated in an 8K byte mini-computer. The program has been extensively tested with data from 10 different assay systems (RIA and CPBA) for measurement of drugs and hormones ranging in molecular size from thyroxine to insulin. For each assay system the results have been analyzed in terms of (a) curve fitting biases and (b) direct comparison with manual fitting. In all cases the quality of fitting was remarkably good in spite of the fact that the chemistry of each system departed significantly from one or more of the assumptions implicit in the model used. A mathematical analysis of departures from the model's principal assumption has provided an explanation for this somewhat unexpected observation. The essential features of this analysis are presented in this paper together with the statistical analyses of the performance of the program. From these and the results obtained to date in the routine quality control of these 10 assays, it is concluded that the method of curve fitting and dose interpolation presented in this paper is likely to be of general applicability. (Atomindex citation 09:386261)

AED-Conf-77-461-029 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).

Accurate Radioimmunoassay of Human Growth Hormone with Separation on Polyacrylamide Gel Electrophoresis of Free Antigen; Antigen-Anti-Body Complex and Damaged Labelled Antigen: A Study Is Performed on This Last One for the Purpose of Obtaining Long-Lasting Labelled Products.
P. Bartolini, L. M. Assis, I. Schwarz, M. Macchione, and R. R. Pieroni. 1977, 6p CONF-7710167-11, IAEA-SM-220/47
Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

The objective of this porject was to develope of a radioimmunoassay method accurate and precise enough to furnish a suitable way for determining human growth hormone (HGH) in extracts or in physiological fluids, useful more for specific research purposes than for routine clinical assays, and where the labelled products could be used as long as possible. Only one technique was found that these requirements, though in some respects more laborious than others: Polyacrylamide Gel Electrophoresis (PAGE). This was used introducing some modifications to the original method of Davis, and it was possible, using tubes 11 cm long, to separate on the same gel, the free, the antibody bound, and the damaged labelled antigen. The method, being able to detect separately and independently these three components and to give a better control on the analytically dangerous 'damaged', furnished accurate and reproducible curves. An example of determination is the one on KABI-Crescormon, that compares the results obatined with the present technique to those presented by another laboratory. Thanks to this method the labelled antigen could be used up to one month of time. After this period a re-purification on Sephadex was introduced so that the same labelled product was profitable for two more months. Parallel to this work a study has been performed on the various components originating in this so called process of 'damaging', and a particular importance has also been given to a more precise knowledge of the amount of antigen, in terms of mass, present in an assay. (Atomindex citation 09:386216)

AED-Conf-77-461-036 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Elementary Components of Variance Analysis for Multi-Center Quality Control.
P. J. Munson, and D. Rodbard. 1977, 16p CONF-7710167-38
Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

The serious variability of RIA results from different laboratories indicates the need for multi-laboratory collaborative quality control (QC) studies. Statistical analysis methods for such studies using an 'analysis of variance with components of variance estimation' are discussed. This technique allocates the total variance into components corresponding to between-laboratory, between-assay, and residual or within-assay variability. Components of variance analysis also provides an intelligent way to combine the results of several QC samples run at different evels, from which we may decide if any component varies systematically with dose level; if not, pooling of estimates becomes possible. We consider several possible relationships of standard deviation to the laboratory mean. Each relationship corresponds to an underlying statistical model, and an appropriate analysis technique. Tests for homogeneity of variance may be used to determine if an appropriate model has been chosen, although the exact functional relationship of standard deviation to lab mean may be difficult to establish. Appropriate graphical display of the data aids in visual understanding of the data. A plot of the ranked standard deviation vs. ranked laboratory mean is a convenient way to summarize a QC study. This plot also allows determination of the rank correlation, which indicates a net relationship of variance to laboratory mean. (Atomindex citation 09:391826)

AED-Conf-77-461-039 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Assay of Serum Ferritin by Two Different Radioimmunometric Methods and Its Clinical Significance.
J. P. Kaltwasser, and E. Werner. 1977, 4p CONF-7710167-13, IAEA-SM-220/62
Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

Serum ferritin was measured by two different radioimmunometric methods a) the Addison assay, and b) a commercial radioimmunoassay. Iron storage in the body was determined using exp 59 Fe. A dose correlation was found between serum ferritin and iron storage in the body. (Atomindex citation 09:386231)

AED-Conf-77-461-053 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Different Approach to the Radioimmunoassay of Thyrotropin Releasing Hormone.
T. J. Visser, W. Klootwijk, R. Docter, and G. Hennemann. 1977, 7p CONF-7710167-41, IAEA-SM-220/90
Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

Thyrotropin releasing hormone (TRH) was linked to hemocyanin by means of a dinitrophenylene moiety. TRH (pGlu-His-Pro-NH sub 2) was made to react with a large excess of 1,5-difluoro-2,4-dinitrobenzene to yield Nsup(im)-(5-fluoro-2,4-dinitrophenyl)TRH. After removal of excess reagent the derivative was coupled to hemocyanin with a minimum of side-reactions. From two rabbits out of four immunized with this material valuable antisera were obtained, which were used in the radioimmunoassay of the hypothalamic hormone at a final dilution of 1:7,500 and 1:15,000, respectively. The properties, especially with regard to specificity, of these antisera were studied and compared with another antiserum, which was obtained using a conjugate having TRH linked to thyroglobulin via a p-azophenyl-acetyl moiety. Despite the difference between the derivatives, i.e. the nature and the point of attachment of the side chains, the specificities of the assays were very similar. Deamidation of TRH, deletion of either one of the terminal residues, hydrolysis of the lactam of the pyroglutamyl residue, and replacing Pro-NH sub 2 by Pro-Gly-NH sub 2 or by an octapeptide chain yield peptides with strongly diminished cross-reactivities. However, Nsup(im)-benzyl-TRH and pGlu-Phe-Pro-NH sub 2 were 5-10 times as active as TRH probably due to a closer physico-chemical similarity to the arrangement of the haptens in the conjugates. This suggests that the sensitivity of the radioimmunoassay may be increased markedly by conversion of TRH into the Nsup(im)-dinitrophenyl derivative and by using a related compound for radioiodination. (Atomindex citation 09:391835)

AED-Conf-78-163-007 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation (ZAED), Eggenstein-Leopoldshafen (Germany, F.R.).
Preliminary Experience with a Commercial RIA for beta -Thromboglobulin Determination.
D. Neumeier, and W. Vogt. 1978, 9p CONF-7804133-1
In German.Analytica '78, Muenchen, F.R. Germany, 18 Apr 1978.
U.S. Sales Only.

According to the findings of investigations, the RIA described is suitable for routine applications. beta -Thromboglobulin is not suitable as an additional parameter for clinical-chemical diagnosis and course control in myocardial infarction. Determination of the beta -thromboglobulin concentration in addition to the thrombocyte count appears to bear enough interest for further investigations. (Atomindex citation 10:430217)

AED-Conf-78-179-000 PC **A06**/MF **A01**
Deutsche Roentgengesellschaft, Gesellschaft fuer Medizinische Radiologie, Strahlenbiologie und Nuklearmedizin e.V., Hamburg (Germany, F.R.).
German X-Ray Congress. Abstracts by the Authors.
1978, 125p CONF-780593-(Absts.)
In German.59. meeting of the Deutsche Roentgengesellschaft-Gesellschaft fuer Medizinische Radiologie, Strahlenbiologie und Nuklearmedizine e.v. Bonn, F.R. Germany, 4 May 1978.
U.S. Sales Only.

In nuclear medical diagnostics exp 57 Co, exp 131 I, exp 111 In, sup(99m)Tc, exp 133 Xe, exp 201 Tl are the most important radiopharmaceuticals for labelling. Labelling and diagnostic studies in the brain and other organs and tissues are dealt with. Radiobiological studies are mainly concerned with fundamental investigations on changes induced by different kinds of radiation in animal organisms or animal cells and with the problem of dose-limiting tissues. (Atomindex citation 10:421032)

AED-Conf-78-188-000 MF **A01**
Deutsche Gesellschaft fuer Medizinische Physik e.V., Berlin (Germany, F.R.).
9TH Scientific Meeting of the Deutsche Gesellschaft fuer Medizinische Physik E.V. . 2ND Invitation - Abstracts - Industry Catalogue.
1978, 226p CONF-7804140-(Absts.)
In German.Scientific meeting of the Deutsche Gesellschaft fuer Medizinische Physik e.V. Stuttgart, F.R. Germany, 27 Apr 1978.
U.S. Sales Only. Microfiche copies only.

Contributions to the radiation protection problem, taking into account the radiation protection ordinance, recently developed radiographic methods in medical diagnostics, especially with regard to automation of the imaging technique, and contributions to radiation therapy with regard to apparatus and equipment are discussed. (Atomindex citation 10:441475)

AED-Conf-78-201-005 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Radioimmunoassay Techniques in Cancer Medicine.
D. J. R. Laurence. 1978, 4p CONF-7805173-1
Meeting on radiochemistry in medicine, Sutton, UK, 17 May 1978.
U.S. Sales Only.

The RIA principle is described, and the application of this technique in cancer treatment is discussed. In general, exp 125 I is used as tracer. The application of RIA in tumour diagnosis is illustrated by various examples. (Atomindex citation 10:441511)

GKSS-78/E/14 PC **A02**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Physik.
Fast Neutron Radiography of Extended Biological and Medical Objects.
E. Duehmke, and L. Greim. 1978, 7p CONF-771083-2
In German.Symposium on training programs in medical physics, Rio de Janeiro, Brazil, 23 Oct 1977.
U.S. Sales Only.

Fast neutron radiography enables us to image extended objects and yields quite different pictures than conventional roentgenograms. Using foils of cellulose nitrate and the track etching technique, a gamma -ray-insensitive detector is available providing sufficient imaging qualities. One of the biological neutrograms shown in the paper is of special importance because one can see a malignant tumor of the columna vertebralis. This finding was not detectable by roentgenological examination. (Atomindex citation 09:401703)

HRP-0018707/0 PC **A05**/MF **A01**
University of Northern Iowa, Cedar Falls.
A Study of the Job Performance of Delta College Nursing Graduates.
Research rept.,
Barry J. Wilson. 1975, 90p
Prepared in cooperation with Delta Coll., University Center, MI.

According to on-the-job performance ratings of 153 percent graduates in nursing from Delta College in Michigan, their scholastic performance, as measured by grade point averages (in science, nursing, overall and high school) and their test scored on state board examinations (in medical, surgical, obstetrical, pediatric, and psychiatric

areas) showed little or no correlation with job performance. The nurses were rated on a 62-item scale measuring their performance in planning for nursing care, implementation of nursing care, interpersonal relationships, communication, leadership and group procedures, evaluations and reporting of nursing care, and professional involvement. The study recommends that nurses be given more clinical experience while in school, and that they be given more leadership training, and more courses in pharmacology, physiology, anatomy, and nutrition. The nurses' performance on their job ratings is also probably affected by a number of personality variables. A nine-item bibliography is included, as are 11 appendixes showing the nurses' ratings on the 62-item performance scale, and employment characteristics of the graduates.

HRP-0023786/7 PC **A07**/MF **A01**
Center for Research in Ambulatory Health Care Administration, Denver, CO.
Current Group Practice Administration. Methodology Report,
Edward K. Morita, and Carl H. Slater. 1977, 127p
Contract N01-MB-4-4176
Prepared in cooperation with Colorado Univ. Medical Center, Denver. See also Final Report, HRP-0002168.

The methodology used to study activities of medical group practice administrators for educational curriculum development purposes is examined. Subgrouping variables, definitions, and objectives are outlined. The methodology involves empirical development of a standard list of administrative tasks using the Katz/Kahn model, construction of questionnaires, maintenance of time/activity logs, on-site interviews, and a mail survey of Medical Group Management Association administrators. It is concluded that the multiple methodological techniques applied are useful but sometimes difficult to manage, that the task list becomes organizational rather than role-oriented, that filling out the questionnaire is too time consuming (45 minutes) to produce high response rates, that no distinction is made as to task or administrator effectiveness, and that only the administrator's view of tasks performed is considered. Further research on how administrators fulfill the desired tasks is recommended. A bibliography and one table are included. Also, eight appendixes provide the following: instructions for writing tasks statements and for maintaining time/activity logs; questionnaires for administrators, medical directors, and Governing Body chairpersons; the interview protocol; and followup letters.

HRP-0024430/1 PC **A13**/MF **A01**
Texas Area 5 Health Systems Agency, Inc., Irving.
Indicators of Health Status - Texas Health Service Area 5.
Feb 78, 278p
Color illustrations reproduced in black and white.

Narrative and statistical information on the health status of residents served by the Texas Area 5 Health Systems Agency, Inc., is presented. Changes in disease patterns have occurred throughout the United States, and there has been a decline in deaths caused by infectious and parasitic diseases. Social, economic, and demographic events have accompanied these changes. Determinants of health status are human biology, the environment, lifestyle, and health care organization. In Texas Area 5, the average death rate during 1970-74 was 813.8 deaths per 100,000 population. Three chronic diseases (heart disease, cancer, and stroke) accounted for 63.9 percent of all deaths. Deaths of a perinatal origin, congenital anomalies, and pneumonia were responsible for most deaths involving infants under 1 year of age. Accidents constituted the leading cause of death for adolescents between 1 and 14 years of age. Violence (including homicide and suicide) and accidents were the leading causes of death for adults between 15 and 44 years. After 45 years of age, heart disease, cancer, and stroke became leading causes of death. The population at risk in Texas Area 5 is assessed in terms of such health status indicators as natality, mortality, morbidity and disability, alcoholism, drug abuse, mental health, and developmental disabilities. References are cited, and appendixes contain methodological information on death rate calculations for the area and prevalence estimates of the population in need of services for selected mental health problems.

HRP-0026833/4 PC **A02**/MF **A01**
Southwest Center for Urban Research, Houston, TX.
Technical Assistance Function of Health Systems Agencies,
Lew Lefko. 1977, 16p

Guidance on the expected technical assistance functions of health systems agencies (HSA's) in the Region VI Center for Health Planning (Texas, New Mexico, Oklahoma, Arkansas, and Louisiana) is presented. Technical assistance provided by such HSA's is mandated under provisions of Public Law 93-641; for funding, planning, and development of agency priority projects. Technical assistance as an implementation tool incorporates establishing priorities and specific health needs of the area, describing and applying evaluation strategies, and supplying actual technical assistance. The technical assistance function normally involves planning, implementation, and evaluation. Various technical assistance roles which are proposed for HSA's are advisory, convener, clearinghouse, and disseminator. Possible activities involved in carrying out these roles are listed. The advisory role may include plan and program development and professional recruitment. The covenor function includes review procedure briefings, workshops, and task forces. The clearinghouse function relates to provision of information on problems and solutions, resource directories, and agency data and records. Technical assistance dissemination includes formulating agency policies, procedures, plans, reports, implementing activities, and public information.

HRP-0027094/2 PC **A03**/MF **A01**
Roche Labs., Nutley, NJ.
Canadian National Health Insurance: Lessons for the United States,
Cotton M. Lindsay, Steven Honda, and Benjamin Zycher. c1978, 48p
Prepared in cooperation with California Univ., Los Angeles.

The effectiveness and financing of Canadian national health insurance (NHI) is analyzed to assist in determining the appropriateness of this system as a model for the U.S. Discussion relates to organization and background of NHI, access to medical care, NHI effects on socioeconomic and geographical distribution of care, empirical testing of long-run access implications, a geometric model of provincial budgetary choice, statistical analysis of NHI programs, and social welfare reductions. It is concluded that while there may be some short-term redistribution of medical care away from high income groups to low income groups, the average citizen must finance the medical program both through taxes and time spent waiting for lower quality care, that in the long run the reimbursement scheme of Canada may actually decrease care to low access groups because of geographical problems with physician distribution, and that hospital and medical care parts of the program have been paid for at the expense of other social welfare spending categories. It seems likely that an American NHI program would also redistribute funds away from the poor and provide little flexibility in social welfare spending. A bibliography, 15 tables, and two appendixes are included.

HRP-0028004/0 PC **A04**/MF **A01**
Missouri State Dept. of Social Services, Jefferson City. State Health Planning and Development Agency.
The Nursing Home Industry in Missouri--Its Quality and Adequacy to Meet the Needs of Missourians,
Dianne Petersen, Steven Mahford, and David Carr. Feb 78, 71p

Governor Teasdale is deeply concerned about the care being provided to elderly Missourians residing in nursing homes, how accessible that care is and how well they are able to pay for it. Another major concern of the Governor is the loneliness and social neglect that face many of these residents. No long term study of the issue was available for review. Therefore, the Governor requested the Department of Social Services to report on the many concerns relating to the topic. This report seeks to bring to the surface those facts, observations, and emotions which will give an insight into the nursing home industry in Missouri. The report examines the process and the problems of the industry based on readily available data, observations, and local assessments of the needs of the aged.

HRP-0028727/6 PC **A02**/MF **A01**
Massachusetts Health Research Inst., Inc., Boston.
Uses of Expenditure and Utilization Data for Health Planning,
Suzanne Grisez Martin, and Nancy Russell Hill. 1979, 14p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. Proceedings of the Public Health Conference on Records and Statistics, Concurrent Session E, June 6, 1978.

Limiting increases in the cost of health care is a goal of most health planning agencies, although they rarely have information on the pattern or level of local health expenditures. This information gap is recognized by planners at the state, local and federal level and there are a growing number of activities aimed at improving the ability of state and local agencies to estimate health care costs. The Applied Statistics Training Institute (ASTI) has offered a course on estimating health expenditures for several years; conferences such as this one now have panels discussing the availability of expenditure data at the local level; and policy statements by the Bureau of Health Planning and Resources Development (BHPRD) have emphasized the need for expenditure data for health planning. Many Health Systems Agencies (HSAs) and State Health Planning and Resource Development Agencies (SHPDAs) are in the process of estimating health expenditures within their own areas.

HRP-0029193/0 PC **A05**/MF **A01**
MGT of America, Inc., Tallahassee, FL.
Recommended Acute Care Need Methodology. Final Report.
20 Dec 78, 99p
Sponsored in part by Florida State Dept. of Health and Rehabilitative Services, Tallahassee, and Health/Planning/Development Center, Inc., Atlanta, GA. Prepared for Florida Task Force on Institutional Needs.

The methodology recommended here for use by the State of Florida to predict the services required for acute care has the following advantages over the presently used methodologies: it employs statewide use rates that are broken down by age and sex, projects the bed needs for 10 service categories rather than an aggregate bed need, estimates the services required by the population of a health service agency rather than that of a political subdivision, and provides a range in the number of locations in which a service could be established. The methodology is based on such factors as the composition of the population that is to be served, the variations in need by age and sex, the different services that can be provided by different facilities, and the geographic distribution of the population. The methodology uses different use rates for predicting the need for bed services and for non-bed services. The methodology also recommends those services that should be provided, including burn care, CT (Computed tomography) scanner, radiation therapy, and coronary care, in addition to the usual medical and surgical services. The methodology was tested in a field study. Recommendations for further development are provided. An appendix defines the equipment and care that is included in the different types of services.

HRP-0029406/6 PC **A08**/MF **A01**
Harvard Center for Community Health and Medical Care, Boston, MA.
Improving the Chances for Health: Some New Approaches to Lifestyle Change and Health Evaluation,
Katharine G. Bauer. Dec 78, 152p R62
Sponsored in part by Robert Wood Johnson Foundation, Princeton, NJ.

This report deals with current efforts to reduce the painful and costly burden of avoidable illness and premature death in the nation's population through courses of action taken before rather than after people become sick. Application of preventive measures, both in public health programs and in medical practice, have been largely responsible for the conquest of the communicable diseases that constituted the major threats to health and longev-

ity earlier in this century. In some quarters there is hope that new applications of the same principles can make substantial inroads on the incidence of unnecessary or untimely heart disease, injuries, cancer, chronic obstructive lung disease and a few other conditions that together constitute the major threats to health today. However, this task is made exceedingly complex by the multiplicity of interacting biological, social and environmental factors that must be understood and dealt with in designing successful anticipatory actions to preempt the development of most chronic diseases and accidents.

HRP-0029434/8 PC **A02**/MF **A01**
Wisconsin Nursing Home Ombudsman Program, Madison.
Care for Cash - An Examination of Nursing Home Care Denied Medicaid Recipients.
17 Dec 78, 12p

This Wisconsin's Nursing Home Ombudsman Program (NHOP) report focuses on discrimination against Medicaid patients in Milwaukee nursing homes. Data were collected by NHOP from individuals and placement personnel. Negative consequences of the discrimination discussed include hardships for Medicaid recipients seeking nursing home care and financial burdens for taxpayers. Unnecessary costs are generated when discrimination results in inappropriate hospitalization. Federal regulations prohibiting discrimination against Medicaid recipients are cited in detail. Possible approaches to Wisconsin's problems are suggested, ranging from contractual to administrative to State legislative prohibitions against discrimination. Stress is laid on the need for clear and unequivocal laws since Federal legislation has met with contradictory interpretations.

HRP-0029538/6 PC **A03**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Access to Medical Care for Grand Rapids' Central City Population.
1978, 31p STUDY-78-12

The West Michigan Health Systems Agency has applied Federal criteria and determined that an area comprising 17 census tracts in Grand Rapids should be designated a health manpower shortage area and a medically underserved area. The analysis indicates that the area has an unusually high need for primary care services as evidenced by its Index of Medical Underservice Score, its infant mortality rate, its live-birth rate, and the percent of its population having an income below the poverty level. The area is characterized by a lower-than-arerage per capita income and by high percentages of jobless heads-of-household and of female heads-of-household. The methodology used in the analysis took into account the geographic identification of the area and its demographic characteristics, the shortage area population size, population groups within the area, the degree of health needs, physician supply and the problem of access, primary care physician full-time equivalents, criteria for health manpower shortage area designation, and criteria for medically underserved area designation. The findings in each of these areas are explained in detail. Maps of the area are provided.

HRP-0029688/9 MF **A01**
Harvard Center for Community Health and Medical Care, Boston, MA.
A Comparison of State Medicaid Programs, Massachusetts,
Paul M. Densen, and Emily Friedan. 14 Oct 76, 42p
Available microfiche only because of poor quality.

Massachusetts had the third largest Medicaid expenditures per inhabitant in 1975 of any State, with expenditures of $91 per inhabitant, which was 42 percent higher than the national average. Only New York and the District of Columbia exceeded Massachusetts' expenditures per inhabitant. Of 10 States with comparable demographic mixes, Massachusetts had the highest expenditures of all. On the other hand, Massachusetts' expenditures per recipient were only 14 percent higher than the national average, implying that Massachusetts' Medicaid program reaches a greater proportion of its population, giving a higher payment per inhabitant. The higher payments seem to be concentrated in payments to the elderly. Medicaid recipients 65 years old and older receive $336 each in Massachusetts, compared with $188 each in the other 10 comparable States. Medicaid expenditures per inhabitant for families with dependent children were $23 in Massachusetts, the same as in the other 10 comparable States. The high costs of Massachusetts' Medicaid may also be due to a greater use of institutional care. A greater percentage of Medicaid payments go to hospitals and nursing homes in Massachusetts than in other States. Eight tables and 14 appendix tables present the data in more detail.

HRP-0029800/0 PC **A03**/MF **A01**
Boston Univ., MA. Center for Health Planning.
Supplementary Materials to the Hospital Bed Supply Standards of the National Guidelines for Health Planning,
Richard D'Ambrosio. 1979, 45p

Data on hospital acute care bed/population ratios by State are presented, and are designed to help health systems agencies and State health planning and development agencies reduce costs in accordance with national guidelines for health planning. It is estimated that there are over 100,000 underused hospital beds in the country. As a standard for bed supply, it is recommended that there be less than four short-stay hospital beds for each 1,000 persons in a health service area. Adjustments to the hospital bed supply can be justified if the percentage of elderly persons in an area is more than 12 percent, large variations in hospital utilization occur due to vacation and recreation patterns or needs of migrant workers, most residents are more than 30 minutes travel time from a hospital, large numbers of beds in one part of an area can be compensated for by fewer beds in other parts of an area, and health systems agencies can exclude from their computation of bed supply referral hospitals where referred patients live outside health service areas. Five ways of reducing excess hospital bed capacity are noted: retire individual beds; service departments; and whole hospitals; declare a moratorium; and convince third-party payers to try incentive insurance to convert the public from inpatient to outpatient services. Supporting Data for health systems agency and State strategies to reduce excess hospital beds are provided.

HRP-0029856/2 PC **A02**/MF **A01**
Boston Univ., MA. Center for Health Planning.
General Comments on Health Education Planning Actions in AIPs (Annual Implementation Plans) of New England HSAs (Health Systems Angencies),
Jeannette J. Simmons. 1979, 13p
Contract PHS-HRA-232-78-0108

Public education about health planning, the operationalization of goals, and health education planning are discussed. Many annual implementation plans (AIP's) do not address the way they plan to educate the general public about concerns and interests of health systems agencies (HSA's) and do not interpret what health planning is and how HSA's should develop plans to improve health status, health resources, and the effective use of health services. Four ways of determining the effectiveness of a public information and education program are: (1) identify decisionmakers and providers in mass media who should be involved in the dissemination of information about HSA activities; (2) plan for the regular disseminaton of information about specific goals, objectives, activities, and progress to persons other than those actively involved in the HSA structure; (3) establish mechanisms for feedback from all resources; and (4) develop systematic ways of monitoring what is disseminated, used, and fed back to all resources. Although AIP's have extensive mortality and morbidity data for their areas, they frequently do not have utilization data for health services. Key points to be included in a screening program are means of detection, referral to care, selection of appropriate therapy and surveillance, and long-term maintenance of therapy. It is recommended that population concerns and behaviors be analyzed in decisionmaking about health education planning.

HRP-0030153/1 PC **A02**/MF **A01**
Alpha Center for Health Planning, Bethesda, MD.
Developing More Effective Committees,
James B. Webber. Jun 79, 24p
Contract PHS-HRA-232-78-0113

Health Systems Agencies (HSAs) and Statewide Health Coordinating Councils do their work through committees. Agency leadership has continuing concerns regarding the effectiveness of committee work - the ability to accomplish the prescribed task, and the efficiency of such work - the time and effort expended compared to the results achieved. The purpose of this paper is to suggest an approach to developing more effective committees that has proven useful to HSAs in Region II.

HRP-0030188/7 PC **A03**/MF **A01**
George Warren Brown School of Social Work, St. Louis, MO.
Establishing a Community Based Treatment Program for Anti-Social Children: A Five Year Evaluation,
John S. Wodarski, Ronald A. Feldman, and Stephen J. Pedi. 1976, 39p
Paper presented at Annual Meeting of National Conference on Social Welfare (102nd) held at Washington, DC. on June 1976. Prepared in cooperation with Maryland Univ., Baltimore. School of Social Work and Community Planning, and Catholic Social Services, Grand Rapids, MI. Sponsored in part by National Inst. of Mental Health, Rockville, MD.

A 5-year investigation related to the evaluation of treatment strategies for antisocial children, types of groups, and the extent of worker training needed to effectively treat antisocial behavior is reported. The site for study was a community agency involved in the provision of recreational, leisure time, and educational services for 16,000 members. Subjects were boys ranging in age from 8 to 16 years. They were defined as antisocial according to diagnostic measures used by members of the professional therapeutic community (teachers, counselors, psychologists, and social workers). Treatment methods included controlled treatment, social learning, and traditional group work. Antisocial, prosocial, and nonsocial types of behavior were defined. Children completed self-inventories 8 weeks after the initiation of the treatment program and 4 weeks before program termination. The findings indicated a need for persons interested in establishing a treatment program for antisocial children to consider adequate specification of behavioral types, characteristics of persons who deliver services, what mechanisms should be used to deliver services, conceptualization and operationalization of treatment interventions, specification of criteria upon which treatment change is to be evaluated, and monitoring of treatment interventions and providing feedback to practitioners. Supporting data and references are provided.

HRP-0030250/5 PC **A09**/MF **A01**
California Governor's Special Committee on Health Care Costs, Sacramento.
Governor's Special Committee on Health Care Costs (Report).
Jan 79, 198p

The governor of California established a committee to study the rise in health care costs in the State and to develop recommendations for controlling these costs. The committee's results show that the health industry operates in such a way as to make the usual idea of market competition invalid. With this understanding, the committee members developed 19 recommendations, which they felt would yield a system for the financing and provision of health services in California that would be effective and yet reasonable in cost. The recommendations focus on Medi-Cal, health resources planning and development, and economic incentives and accountability. The committee recommended that prepaid health programs replace the traditional fee-for-service system that is currently the norm. They suggested that the California certificate of need law should conform to the Federal health planning law. Laws should also be enacted to phase out unneeded hospitals, to relocate inappropriately located services to convert unused beds to other uses, and to encourage cost-effective forms of health delivery. Recommendations for incentives to increase economic competition, restructure health insurance, improve the quality of

care, and improve the State's budget and rate review program are included.

HRP-0030287/7 PC **A03**/MF **A01**
TAC/X Center for Health Planning, Boise, ID.
Implementation, It's Not the Next Step, it's Everything,
Michael Cook. May 79, 34p
Contract PHS-HRA-232-78-0121

The importance of implementation in health systems agencies, State health planning and development agencies, and statewide health coordinating councils is stressed. Ways in which the lack of an effective implementation program can be avoided pertain to the selection of strategies, segmentation of targets, persuasive, and power strategies. Examples of the use of educative strategies include writing a good plan to present facts, the use of mass media to present facts, staff and board presentations to local civic groups, publication of white papers, and teaching an agency how to obtain grants necessary for the implementation of a project. The use of facilitative strategies assumes that the target group already recognizes a particular problem, is in general agreement about the necessity of change, and is open to external assistance in resolving a problem. Persuasive strategies attempt to create change by reasoning, urging, and inducement, with much advertising and daily interpersonal communicaton having a strong persuasive content. The use of coercion to obtain target compliance is involved in power strategies. Procedures for organizing the implementation process are described and illustrated, and the need for agency attention to generalized implementation approaches is considered. Implementation games and worksheets and a list of references are provided.

HRP-0030405/5 PC **A03**/MF **A01**
Regional Health Planning Council, Newark, NJ.
Home Health Care.
21 Jul 77, 44p

This report discusses issues pertaining to home care of Medicare patients in New Jersey who were referred from acute care hospitals. Factors affecting the extent of home care programs include third party reimbursements, consumer and physician attitudes, and discharge planning. The scope of home care services is detailed, and encompasses intensive, intermediate, and basic home care. Rehabilitation and restorative nursing care are also described. Services range from self-care and educational activities to practice in the use of special devices or maintenance of treatments. Data for utilization of home care in New Jersey during 1973-75 indicate a static number of patients but increasing home visits per patient. Data for hospital referrals and potential cost savings due to reduced hospitalization are also presented. Four major objectives for upgrading home care services are stated, accompanied by brief proposals for implementation. Stress is laid on educating both consumers and physicians in the benefits of home care where it is applicable. Detailed discussions of Blue Cross, Medicaid, and Medicare coverage and regulations are provided. A bibliography and tables are included.

HRP-0030444/4 PC **A05**/MF **A01**
Medical Arts Clinic Association of Corsicana, TX.
A Rural Medical Care Delivery System. A Comprehensive Plan for Rural Health Care with Special Emphasis on the Coordination of Family Practice with Multi-Specialty Group Practice.
26 Sep 77, 85p
Prepared in cooperation with Texas Univ. Health Science Center at Dallas.

The multitude of problems revealed in the extensive survey of rural medical practice requires a coordinated effort between those in private practice, health planners at all levels, and a major health science center. Ten priorities in the health field have been defined through public law. These priorities serve as guidelines for systems development. For several years, there has been continuous dialogue between the Medical Arts Clinic Association of Corsicana (a 28 man multi-specialty clinic), Texas Area 5 Health Systems Agency, and the University of Texas Health Science Center at Dallas. Visits have been made to the Medical Arts Clinic Association of Corsicana by staff members of Texas Area 5 Health Systems Agency. All data gathered by the joint Medical Arts Clinic Association and the Health Science Center task force has been reviewed by the Health Systems Agency Staff. Their evaluation has been sought and utilized.

HRP-0030455/0 PC **A04**/MF **A01**
PACT Health Planning Center, Denver, CO.
PACT Health Planning Center Annual Implementation Plan.
1978, 54p
Contract PHS-HRA-230-76-0229

This monograph was written to help health systems agencies (HSA's) implement the goals of their annual implementation plans and to show them how to make revisions in their annual implementation plans. Ten strategies for implementation are discussed: the rational problem-solving strategy; the sales strategy, which views the health systems plans as a product to be sold; the marketing strategy, which views the HSA as a manufacturer producing various product lines to meet consumer demand; the community development strategy; the board-multiplier strategy, which assigns responsibility for implementation of the plan's objectives to individual members of the HSA board; the prior commitment strategy, which assigns responsibility for the objectives to those who worked on formulating them; the resource banking strategy, which identifies local elements who will support parts of the plan; the conflict strategy, in which the HSA can be the mediator between conflicting parties or can be the target of the conflict; the negotiation strategy, which bargains with different groups for support; and the joint investor strategy, which develops community allies with similar interests (e.g., the boards of local hospitals). Issues to be discussed before revision begins, target levels, new data and developments are also covered.

HRP-0030573/0 PC **A03**/MF **A01**
Wisconsin Dept. of Health and Social Services, Madison. Bureau of Health Statistics.
Descriptive Data on CANCER in Wisconsin, 1977. Mortality, Reported Cases.
1979, 41p

Information on cancer in Wisconsin for 1977 is reported according to frequency, relation to other diseases, and mortality trends. The data was collected from death certificates and from the state's file of reported cases. The tables in the first section on mortality report: the rank of cancer as a cause of death by age group and sex; the trends in cancer mortality by sex; a comparison of cancer martality; the three most frequent sites of cancer by sex; cancer mortality by site, race, and sex; and cancer mortality by health service area and by county. The tables in the second section on reported cases include: the number and percent of cases by site, stage of disease, race and sex; the three most frequent sites by race, sex and age; and the number and percent of cases by health service area and county. It is pointed out that data limitations prohibit interpretation of the information without considerable caution. For instance, some figures are incomplete and some are misleading. In addition, when comparisons of mortality and incidence are made, age-adjusted rates must be computed. The inclusion of site grouping codes and health service area tabulations was done to increase the relevance of the information for local health planning agencies.

HRP-0030742/1 PC **A05**/MF **A01**
Massachusetts Dept. of Public Health, Boston.
Preventive Dentistry for Massachusetts: Facts, Goals, Strategies.
Sep 78, 85p

The overall purpose of this report is to provide in language familiar to the lay person a broad picture of the current measures to prevent and/or control the most common oral diseases: dental caries, periodontal disease, malocclusion, cleft lip, cleft palate, oral cancer and dental injuries. Included are a description of the characteristics and extent of these oral problems and a concluding section on strategies for effectively carrying out measures to prevent and/or control oral disease in Massachusetts. The key to a comprehensive public health preventive dentistry program involves application of the preventive tools already known to the dental professional. In addition, knowledge of the obvious barriers that interfere with achievement of oral health must be understood and overcome. The cooperation of educational, political, industrial and social service groups must be enlisted to create an awareness and to effect constructive attitudinal and behavioral changes in consumers to insure their oral health.

HRP-0030803/1 PC **A04**/MF **A01**
Fees, Charges and Costs of Health Care Services: A Chrestomathy on Higgledy-Piggledy Pricing,
Mark S. Blumberg. 5 Apr 77, 62p

Contents:
- Revenue and costs for physician services in hospitals;
- Hospitalization costs at the Massachusetts Eye and Ear Infirmary;
- Activities and revenue of U.S. surgeons;
- Hourly earnings of male and female physicians;
- Fees by type of visit;
- Gross revenue per physician hour in hospital and office;
- Physician gross revenue and time per service;
- Surgeon activities;
- Excerpts from 'input-output analysis and the hospital budgeting process';
- Price discrimination attributable to third parties;
- Education costs included in charges for hospital care;
- Surgical RVU's per minute of surgeon operating room time;
- Revenue to cost ratio by California Hospital Revenue Center.

HRP-0030839/5 PC **A03**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
The Role of Nutrition in Public Health.
1977, 34p ICP/NUT-003
Report on a Working Group, Held at Algiers (Algeria) on October 26-30, 1976.

The status of nutrition in both industrialized and developing European countries was explored by a working group of the World Health Organization. The program of the working group considered four basic aims: (1) to educate the public about the importance of nutrition and a good diet; (2) to collaborate with international, governmental, and nongovernmental organizations in implementing recommendations of the 1975 World Food Conference, particularly with regard to manpower development and research; (3) to study nutritional problems of vulnerable groups, such as women and young mothers, newborn infants, children between 2 and 5 years of age, and the elderly; and (4) to examine the use of collective feeding and ready-made foods. Particular attention was given to the prevention of protein-energy malnutrition and mineral and vitamin deficiencies, the prevention of conditions associated with over-nutrition (adult obesity and its link with excessive weight in childhood, hypertension and cardiovascular disease, tracing of high-risk groups, and preventive efforts), collective feeding (consumption of industrially produced foods and nutritional aspects of collective feeding), quality control, general problems of public education, and advertising for baby foods. References are cited, and medical standards for the marketing of infant foods in Sweden are contained in an annex.

HRP-0030841/1 PC **A02**/MF **A01**
World Health Organization, Copenhagen (Denmark). Regional Office for Europe.
The Organization and Operation of Long-Term Care Services.
1978, 19p ICP/HSD-013
Report on a Working Group, Held at Uppsala (Sweden) on April 12-15, 1977.

This report of a World Health Organization working group indicates that long-term care must use the skills of specialists and resources to deal with acute illness episodes in the institutional setting or at home. Medical, institutional, and organizational arrangements for long-term care in European countries are affected by the changing age structure of the population. As part of an overall effort to

deal with the problems pertinent to the aging process, long-term care involves both temporary services to evaluate the physical, mental, and social status of old or invalid patients and both long-term or permanent residential or outpatient services coupled with different forms of assistance in the home for patients who are unable to manage their lives without help. Since long-term care services encompass health, welfare, and social components, they represent an exchange of multidisciplinary activities. Organizational and operational aspects of long-term care are described, along with the types of institutional services, the relationship between institutional care and domiciliary care, preventive services, and the coordination of medical and social services. Areas of additional investigation about the aging phenomenon are noted.

HRP-0030944/3 PC **A04**/MF **A01**
Michigan Cooperative Health Information System, Lansing.
Health Facilities - Hospitals, Nursing Care Facilities, and Homes for the Aged, Michigan 1976.
Jun 79, 69p
Contract PHS-HRA-233-78-2132

Characteristics of health care facilities in Michigan as of 1976 are reported. Data on 228 non-Federal general hospitals, 23 psychiatric hospitals, 41 county medical care facilities, 129 homes for the aged, 386 nursing homes, and 10 State mental retardation centers are included. A survey was conducted of the facilities, and the data were verified using alternative sources. A total of 25 tables are presented that show the number of facilities, number of licensed beds, average daily census, occupancy rates, services, numbers of affiliated physicians, and number of professional and nonprofessional employees by county, health service area, and State. A trend analysis of the years 1969-76 revealed that the number of beds in homes for the aged, nursing care facilities, and short-term hospital units increased, while the number of beds in mental retardation centers and long-term hospital units decreased. Notes on data sources, a list of definitions, samples of data collection forms, and a map of Michigan health service areas are provided.

HRP-0030952/6 PC **A04**/MF **A01**
Arizona State Univ., Tempe. Coll. of Nursing.
Comparison of 1982 Nursing Manpower Needs for Arizona Using Two Projection Models.
Master's thesis,
Penelope K. Ewen. May 79, 68p

Two projection models are used to predict 1982 nursing manpower meeds in Arizona. Projected needs derived from an economic demand model and a health needs/service target model are compared. An estimate of current 1977 Arizona manpower demand for registered nurses was derived from relicensure applications. The educational backgrounds of licensed nurses and the optimal distribution of nursing positions according to educational preparation were analyzed, and an extrapolation was made from current to future educational preparation. The economic demand and health needs/service target models projected similar totals for 1982 nurse manpower needs. However, wide differences were found in the two models' projections according to differential educational backgrounds. It is concluded that in Arizona there is a tendency to place nurses with less educational preparation in positions which would be optimally filled by nurses with a higher level of education. Included are a review of related literature and manpower models, Arizona population figures, and tabular presentations of projection and distribution.

HRP-0031555/6 PC **A02**/MF **A01**
American Public Health Association, Washington, DC.
Community Resources to Promote Child Health,
Olga Brown. 1979, 21p
Presented at the Annual Meeting of the APHA (107th), New York, NY., November 4-8, 1979.

A program to increase the immunization rates of preschoolers through the enlistment of traditional community support organizations is described. Immunization is normally centered in seven Well Baby Clinics in the study city. A survey of one clinic revealed a less than 15 percent complete immunization rate. Local organizations including the Council of Churches, the American Red Cross, the State Health Department, and local newspapers and radio were contacted concerning the immunization problem. A special film was broadcast, sessions were held at community centers, and workshops conducted with the Council of Churches. Six months later, nurses examined all of the Health Department Well Baby Clinic records. The complete immunization rate rose from 46 percent to 67 percent. Tabular data show the increases in rates of immunization and compare clinic populations and immunizations given in the years 1978 and 1979, before and after the immunization effort. It was concluded that the combination of a community-wide immunization effort with the threat of a law prohibiting unimmunized children from attending school led to the great increase in immunization rates.

HRP-0031657/0 PC **A13**/MF **A01**
South Carolina Office of Cooperative Health Statistics, Columbia. Div. of Research and Statistical Services.
Registered Nurses and Licensed Practical Nurses.
Apr 79, 278p
Contracts PHS-HRA-233-79-2154, PHS-HRA-233-79-2058
Prepared in cooperation with South Carolina State Board of Nursing, Columbia. See also report dated Apr 77, HRP-0031295.

Part of the South Carolina Cooperative Health Statistics System, this report contains data on registered and licensed practical nurses in the State as of 1979. Ten licensing boards for health or health-related manpower professions exist in South Carolina, and these boards licensed/register or relicense/reregister over 33,000 health professionals on an annual or biennial basis. The relicensure process reaches all licensed health professionals in the State and facilitates the collection of information about these persons and their role in health care delivery. The survey of registered and licensed practical nurses in South Carolina can be merged with similar surveys in other States to form a national information system that is responsive to State and local user needs and that provides data needed for planning at regional and national levels. The survey questionnaire and a map of health service areas in South Carolina are provided. Data on nurses cover highest educational degree, employment setting, sex and age, location of residence, race, years active in practice, year of graduation from nursing school, hours worked per week, and type of nursing position.

HRP-0900053/0 PC **A10**/MF **A01**
Bureau of Health Planning and Resources Development, Hyattsville, MD.
The Health System Economic Profile.
Project rept.
15 Apr 77, 202p
See also report dated Dec 76, HRP-0900054.

This document is one of three companion reports produced in the course of a project to develop and test an approach to a methodology for the description and economic analysis of areawide health care delivery systems for use by Health Systems Agencies (HSAs). The approach developed and tested in the course of the project has been entitled the Health System Economic Profile (hereafter abbreviated and referred to as the HSEP). Application HSEP to the areawide health care system of an HSA culminates in a set of single-page reports (or profiles), each of which describes a defined component of the areawide system in financial and physical terms. Singly and in combination, the individual reports represent a data resource for further analysis and understanding of the area system. Taken together, the reports and their underlying data constitute a first step toward the characterization of an area health system as an economic entity within the fabric of the larger state and national health care systems.

HRP-0900123/1 PC **A09**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
A Review of Physicians' Requirements Forecasting Methodologies.
6 Dec 77, 177p AAI-77-121
Contract PHS-HRA-231-77-0096

The objective of this study is an exploration of the suitability of various types of physician requirements models for representative types of Health Systems Agencies (HSAs). This paper contributes to the study by reviewing the available literature on physician forecasting. However, it goes beyond merely recapitulating what is in the literature and its appropriateness to HSA forecasting, to relate available forecasting methods to issues of actual implementation at an HSA level. In this sense, the paper both defines the dimensions of the gap between the literature and HSA needs and discusses methods of closing the gap.

HRP-0900178/5 PC **A09**/MF **A01**
Health Resources Administration, Hyattsville, MD. Office of Planning, Evaluation, and Legislation.
Public Meeting on Proposed National Health Planning Guidelines--Standards 4, 5, and 6: Neonatal Special Care Units, Pediatric Inpatient Services-Number of Beds, Pediatric Inpatient Services-Occupancy Rates.
17 Nov 77, 195p
Transcript of testimony of meeting held at Washington, DC. on November 17, 1977.

This volume contains the transcript of one of six public meetings which were held by the Department of Health, Education, and Welfare in November 1977 to discuss proposed National Guidelines for Health Planning. These had been developed by the Department pursuant to Section 1501 of the National Health Planning and Resources Development Act (P.L. 93-641) and published as proposed rules on September 23, 1977. (42 FR 48502 et seq.). (After two revisions, the Guidelines were issued as final rules on March 28, 1978, (43 FR 13040)).

HRP-0900179/3 PC **A08**/MF **A01**
Health Resources Administration, Hyattsville, MD. Office of Planning, Evaluation, and Legislation.
Transcript of Testimony, Public Meeting on Proposed National Health Planning Guidelines, Standards 7 & 8: Open Heart Surgery, Cardiac Catheterization Unit Services.
15 Nov 77, 165p

This volume contains the transcript of one of six public meetings which were held by the Department of Health, Education, and Welfare in November 1977 to discuss proposed National Guidelines for Health Planning. These had been developed by the Department pursuant to Section 1501 of the National Health Planning and Resources Development Act (P.L. 93-641) and published as proposed rules on September 23, 1977. (42 FR 48502 et seq.). (After two revisions, the Guidelines were issued as final rules on March 28, 1978, (43 FR 13040)).

HRP-0900180/1 PC **A05**/MF **A01**
Health Resources Administration, Hyattsville, MD. Office of Planning, Evaluation, and Legislation.
Transcript of Testimony, Public Meeting on Proposed National Health Planning Guidelines, Standard 9: Radiation Therapy.
16 Nov 77, 100p

This volume contains the transcript of one of six public meetings which were held by the Department of Health, Education, and Welfare in November 1977 to discuss proposed National Guidelines for Health Planning. These had been developed by the Department pursuant to Section 1501 of the National Health Planning and Resources Development Act (P.L. 93-641) and published as proposed rules on September 23, 1977, (42 FR 48502 et seq.). The format of the meetings consisted of opening remarks, presentations by an invited panel of consumer and provider representatives, a discussion period by panel members, and an open session during which members of the audience were invited to speak. The meetings were publicized in the Federal Register by press release and by individual communication to consumer and provider organizatons. The meetings were chaired by Daniel I. Zwick, Associate Administrator of the Health Resources Administration and by Harry P. Cain, Ph.D., Director of the Bureau of Health Planning and Resources Development.

HRP-0900181/9 PC **A07**/MF **A01**
Health Resources Administration, Hyattsville, MD. Office of Planning, Evaluation, and Legislation.

Transcript of Testimony, Public Meeting on Proposed National Health Planning Guidelines. Standard 10: Computer Tomographic Scanners.
16 Nov 77, 131p

This volume contains the transcript of one of six public meetings which were held by the Department of Health, Education, and Welfare in November 1977 to discuss proposed National Guidelines for Health Planning. These had been developed by the Department pursuant to Section 1501 of the National Health Planning and Resources Development Act (P.L. 93-641) and published as proposed rules on September 23, 1977. The format of the meetings consisted of opening remarks presentations by an invited panel of consumer and provider representatives, a discussion period by panel members and an open session during which members of the audience were invited to speak. The meetings were publicized in the Federal Register, by press release and by individual communication to consumer and provider organizations. The meetins were chaired by Daniel I. Zwick, Associate Administrator of the Health Resources Administration and by Harry P. Cain, Ph.D., Director of the Bureau of Health Planning and Resources Development.

HRP-0900338/5 PC A07/MF A01
Bureau of Health Planning, Hyattsville, MD.
Casebook of HSA Public Affairs Materials.
1979, 132p

Contents:
Casebook of HSA public affairs material;
Introductory leaflets;
Inviting participation in health planning;
Newsletter and mailing list;
Slide presentations;
Health trends;
Perspectives on the status of health;
Press release;
Announcements of public hearings;
News coverage;
Historical perspective.

HRP-0900426/8 PC A05/MF A01
Texas Univ. Health Science Center at Houston. School of Public Health.
Operation MEDICH (Military Experience Directed into Health Careers).
Annual rept.,
Bartholomew P. Hsi. 1977, 88p
Contract PHS-HRA-231-77-0036
See also report dated 1970-71, HRP-0001980.Color illustrations reproduced in black and white.

The Texas Project MEDIHC 1977 Annual Report covers the program's efforts to provide a state focal point of advice and assistance to all health trained veterans seeking entrance to the civilian health services field during the period January 1, 1977 - December 31, 1977. The arrangement of the 1977 Annual Report follows. Chapter I is a summary of the program's operations and outcomes relating to the contract objective. Chapter II - IV present applicant flow through the counseling program and the results of the counseling process as reported at six and twelve month intervals. Restraints experienced in employment and education are reported in Chapter V. Projects that contribute to the constant flow of veterans seeking assistance from Project MEDIHC are described in Chapters VI and VII. The final chapter of the report covers administrative meetings attended by the Texas Project MEDIHC staff during 1977.

HRP-0900427/6 PC A04/MF A01
Washington State Employment Security Dept., Olympia.
Operation MEDIHC (Military Experience Directed Into Health Careers). Final Report.
Rept. for 1 Jul 72-30 Jun 78,
Gene Strand. Sep 78, 64p
Grant PHS-HRA-231-77-0033

MEDIHC's aim was to increase the employment of military medics in the civilian health care industry. Of a total of 1,476 applicants to the program in Washington, State, there were 588 successful and 815 unsuccessful outcomes as of mid-1978. Program responsibilities included visits to military hospital commands, counseling of interested personnel, provisions of information on health-related jobs and training, followup of all employers, and promotion of MEDHIC programs in neighboring States. These functions were performed by the Washington State Employment Service. A multifaceted approach to recruiting applicants was pursued. Problems were encountered due to forces which made further training essential to obtaining employment in a health profession and negative attitudes toward Vietnam veterans. It is believed that the program was most successful in improving the attitudes of potential employers and ehancing the initiative of applicants. Samples of MEDHIC pamphlets and a list of MEDHIC occupational categories are provided. Data on medical placements made, job orders, and characteristics of applicants are tabulated.

HRP-0900428/4 PC A10/MF A01
Institute for the Study of Humanistic Medicine, San Francisco, CA.
A Prototype Center in Humanistic Medicine. Part I.
Final rept.
26 May 78, 222p
Contract PHS-HRA-231-77-0001

In December of 1976, a contract was awarded to the Institute for the Study of Humanistic Medicine for the purpose of developing plans for a Prototype Center in Humanistic Medicine. The Scope of Work for this contract is divided into eight specific objectives. These objectives have been organized into two discrete work responsibilities: those to be developed specifically by the prime contractor, the Institute for the Study of Humanistic Medicine (Objectives I-V), and those to be completed by a subcontractor, the Human Dimensions in Medical Education Program of the Center for Studies of the Person (Objectives VI-VIII). The report describes these activities during the course of this contract and the accomplishments of the overall program objectives.

HRP-0901209/7 PC A10/MF A01
Educational Testing Service, Princeton, NJ.
Health Resources Planning Educational System.
Final rept.,
Arleen S. Barron, and Charles E. Scholl. Jun 78, 215p
Contract PHS-HRA-230-75-0064
See also Summary rept., HRP-0902051.

The Health Resources Planning Educational System project (HRPES) is part of an effort to develop improved and more effective health planning as required under the Comprehensive Health Planning and Public Health Services Amendments of 1966 (Public Law 89-749). HRPES was designed to be national in scope but responsive to regional and local differences. The education aspect was to focus on building the broad bases of competencies and understandings that health planners need to function effectively under proposed legislation (National Health Policy, Planning, and Resources Development Act of 1974), as well as comply with existing requirements. This book describes the development of the functional task analysis (to find out who the health planners were and what their backgrounds were), selection of the subject matter areas for instructional programs, courses that were developed in accord with perceived needs, self-instruction units that were developed, and manuals based on the functional task analysis. Twenty-five appendices include questionnaires that were used to develop the functional task analysis and the courses, examples of course training plans, prototypes for training strategies, and agencies that participated in the functional task analysis, as well as other information.

HRP-0901391/3 MF A01
Southern Illinois Univ. at Carbondale. School of Technical Careers.
Rural Allied Health Manpower Project, 1974-1978. The Planning, Implementation, Evaluating, and Demonstrating a National Model for the Development of Rural Allied Health Manpower.
Final rept.,
Archie G. Lugenbeel. 1978, 368p
Contract N01-AH-4-4114

A national model for the development of rural allied health manpower was created. Southern Illinois University in Carbondale, Ill., was funded to develop a pilot allied health training model that would be applicable to rural areas victimized by health manpower maldistribution. The training model was focused upon atypical students, such as former military corpsmen, minority group members, retired persons, and second career individuals. Regional coordination of educational activities was emphasized and linkages between academic and clinical systems were promoted in order to meet rural health manpower needs. During the period 1974-78, the training program was developed and implemented, and demonstrated capability to train and retain local residents, and thus alleviate the health manpower needs of a local hospital. An overview of health manpower distribution problems and a discussion of the educational state-of-the-art are presented. The setting, participants, development, implementation, and evaluation of the project are outlined. Included in appendixes are a list of program participants, faculty position descriptions, an education training model illustration, an American Hospital Association statement on hospital roles in health manpower development, radiologic technology curriculum development materials, and forms for evaluation.

HRP-0901708/8 MF A01
Association of Schools and Colleges of Optometry, Washington, DC.
A Management Workshop for Institutional Administrators in Optometric and Podiatric Education.
Final rept.,
Lee W. Smith. 16 May 79, 209p
Contract PHS-HRA-232-78-0125
Prepared in cooperation with American Association of Colleges of Podiatric Medicine, Washington, DC.
Available microfiche only because of poor quality.

The Association of Schools and Colleges of Optometry and the American Association of Colleges of Podiatric Medicine developed and conducted a Management Workshop for Institutional Administrators in Optometric and Podiatric Education. The workshop participants represented all five of the colleges of podiatric medicine, fifteen schools and colleges of optometry and representatives of one developing school of optometry. This final report sets forth the various elements of the workshop including participants, faculty, program agenda, curriculum and summary of participants evaluation of the effort.

HRP-0901759/1 PC A06/MF A01
Arkansas State Health Planning and Development Agency, Little Rock.
State Health Plan - 1979.
Apr 79, 114p

The State Health Plan is intended to be a statement of the policies and plans for improving the health status of the residents of the State of Arkansas and for achieving the necessary changes in the existing health care system which will minimize the barriers preventing all residents from receiving health care services needed. The major components of such a document are: (1) the information base which includes the facts, figures, and other information which describes the State, its people, their health stauts and the health resources available at present to serve them, and (2) the specific recommendations for change which grow from an analysis of the available information.

HRP-0901777/3 PC A02/MF A01
New Orleans Public Schools, LA.
Allied Health Professions Counseling Program. Final Report.
Jul 79, 16p
Contract PHS-HRA-231-76-0065

The Orleans Parish Allied Health Professions Counseling Program was a 3 year project developed to evaluate the effectiveness of providing health career information in a structured classroom setting. The program was specifically designed to provide high school students with detailed information concerning technical and professional-level allied health careers and to provide counseling and resource services to the students and to the faculty assigned to the participating schools. It was made available to all interested students in five senior high schools; the average class

consisted of 25-40 sophomores, juniors, and seniors. The program consisted of two classroom phases, counseling sessions, on-site observation, a volunteer work experience program, and an academic remediation program. After reviewing education programs in Louisiana and Mississippi, 36 careers in the following personnel categories were selected: laboratory, diagnostic and therapeutic, rehabilitation, hospital support, medical support, dental support, and veterinary. The major problems stemmed from a lack of commitment from teachers and counselors in the schools selected, and from the academic preparation, attitudes, and interest of students participating in the program. Fourteen recommendations are offered as possible solutions to the eight problems encountered. An outline of the 12-session survey course is included.

HRP-0901779/9 PC **A16**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Evaluation of State Linkage Systems for Health Manpower Planning and Educational Resource Development.
Final rept.,
Perry D. Gohen. Jun 79, 359p
Contract PHS-HRA-231-77-0071

Contents:
- Framework to evaluate linkages;
- Federal implementation of the health manpower linkage program;
- Evaluation of state planning and linkage systems;
- The state context of health manpower planning and its effect on the linkage program;
- The strategy and management of state linkage projects.

HRP-0901788/0 PC **A06**/MF **A01**
California Dept. of Health Services, Sacramento.
Operation MEDIHC (Military Experience Directed into Health Careers).
Final rept.
31 May 79, 106p
Contract PHS-HRA-231-77-0032
See also report dated Jan-Dec 75, HRP-0018184.

The implementation and success of the military experience directed into health careers (MEDIHC) program in California are evaluated. The program became operational in the State in 1971, although difficulties were encountered in initiating the program successfully. Management problems constituted the major problem until 1974, when the program actually began to implement its objectives. Elements of the program encompassed recruitment, vocational guidance and counseling, job development and placement, and the collection of statistical data. The aim was to provide potential military separatees with information about the MEDHIC program and encourage the employment of veterans in medical occupations. The need for MEDIHC services in California, for both veterans and civilians, was demonstrated in program evaluation. It was determined that California has no primary agency to assist with staffing needs in health areas and that health career requirements among all States would be beneficial in making counselors aware of health manpower needs. MEDIHC personnel were viewed as a specialized group with a good reputation. From 1974 through 1979, California was first in the country in terms of the total number of MEDIHC program applicants and placements. A topical index, supporting data, and MEDIHC program forms are included.

HRP-0901790/6 PC **A03**/MF **A01**
Student National Medical Association, Inc., Washington, DC.
Minority Medical Students. Who They Are, Their Progress, Career Aspirations, Their Future in Medical School.
1978, 37p DHEW/PUB/HRA-78-625
Contracts PHS-HRA-230-75-0087, PHS-PLD-9277-77

The report analyzes the status of minorities in U.S. medical schools from 1970 to 1974. The minorities considered are blacks, Native Americans, Mexican-Americans, and Puerto Ricans. Minority students, compared with white students, are more likely to be older, female, and married. They tend to have lower Medical College Admission Test (MCAT) scores than white students and attend medical schools located in a small number of States. The first-year repeat rate for minority students is much higher than that of whites and the first-year retention rate is lower than that of whites. In subsequent years, both rates tend to stabilize closer to those of whites. Minority medical students showed a high interest in serving in physician shortage areas, specifically inner-city areas. This interest was influenced by the location of the medical school and residency and the area where the student grew up. Despite that, the potential for physician imbalance still exists because many students plan to move westward and because areas with large minority populations are not producing enough minority medical students. The data are presented in detail in 15 tables and 18 charts.

HRP-0901793/0 PC **A06**/MF **A01**
Radcliffe Coll., Cambridge, MA.
An Historical Review of Women in Dentistry, An Annotated Bibliography,
Constance Boquist, and Jeannette V. Haase. Jun 77, 114p DHEW/PUB/HRA-77-643
Contract PHS-HRA-106-74-166

This annotated bibliography contains citations on the percentage of women in dentistry and coves the period 1860-1977. It includes 263 citations and 162 original abstracts of articles that were identified through the Medical Literature Analysis and Retrieval System and Educational Resources Information Center surveys and through a search of journals and books related to dentistry or to women and health professions. Studies indicate that the percentage of women in dentistry is lower than in any other health care occupation. In 1972, only 3 percent of all practicing dentists were women. More women are being admitted to dental schools as a result of affirmative action legislation and the recognized need for additional dental manpower. Male prejudice is documented in the literature on women dentists, and sexual bias continues to contribute to the lack of women who choose dentistry as a profession. It is contended that the number of practicing women dentists can be increased by more available day care facilities for children and by more flexible work schedules.

HRP-0901916/7 PC **A04**/MF **A01**
Ohio State Univ., Columbus. Coll. of Medicine.
Ohio Operation MEDIHC (Military Experience Directed into Health Careers).
Final rept. 1 Oct 77-30 Sep 79.
Sep 79, 55p
Contract PHS-HRA-231-77-0056

A 9-year effort to transfer Vietnam veterans trained in health skills into the civilian health care field is described. A total of 4,989 military personnel received counseling and assistance in their efforts to enter the civilian health field. The per capita placement cost was $163, and 2,208 entered educational programs or jobs in the health area. Followup studies indicate that 85 to 89 percent remained in their jobs after periods of one-half to 1 year. Counseling took the form of career information education, personal interviews with knowledgeable people concerning course offerings, and financial assistance information. Particular efforts were made to place veterans in preventive health care and public health positions. The problem of civilian acceptance of military credentials consistently impeded the effort to place veterans. However, by encouraging employers to accept the value of military medical experience, MEDIHC made a positive impact on the health manpower problem in Ohio. Sample MEDIHC application forms are provided. Tabular data showing annual placement distributions are provided.

HRP-0901929/0 PC **A05**/MF **A01**
Government Studies and Systems, Inc., Philadelphia, PA.
Evaluation of the Impact of SHPDAs (State Health Planning and Development Agencies) on the Activities of Other State Agencies. Final Report, Volume II.
Jun 79, 90p
Contract PHS-HRA-232-78-0084
See also Executive Summary, HRP-0901930, and Final Report, Volume 1, HRP-0901931.

In an effort to determine which factors distinguish influential from noninfluential State health planning and development agencies (SHPDA's), site visits to 15 SHPDA's were conducted from November 1978 to February 1979. Each case study includes a general description of the State and organizational characteristics and impact of the SHPDA. Four scenarios -- high impact SHPDA's in an urbanized State and in a sparsely populated State, and low impact SHPDA's in an urbanized State and in a sparsely populated State -- are presented to summarize and emphasize the factors most affecting SHPDA influence. Each case study details the impact of the SHPDA on other State plans; legislation; licensure, rules and regulations; perceptions and attitudes, and coordination and mutual support.

HRP-0901930/8 PC **A02**/MF **A01**
Government Studies and Systems, Inc., Philadelphia, PA.
Evaluation of the Impact of SHPDAs (State Health Planning and Development Agencies) on the Activities of Other State Agencies. Executive Summary.
Jun 79, 11p
Contract PHS-HRA-232-78-0084
See also Final Report, Volume 1, HRP-0901931, and Final Report, Volume 2, HRP-0901929.

This project was commenced to evaluate factors that enhance or reduce the impact of State health planning and development agenices (SHPDA's) on activities of other agencies and units in State government and on other organizations and groups interested in a State's health care system. Three project objectives were to inform DHEW about the predictive validity of some performance measures used to assess SHPDA's, provide ideas for use by DHEW in technical assistance and guidance to SHPDA's, and create materials for use in training and consulting activities of centers for health planning. An important focus of the project was on the distinction between factors that are susceptible to action or change (organization, spending, and coordination) and predictive factors that are beyond the direct influence of State or Federal decision-makers. Six measures of impact were identified. They pertained to the impact of SHPDA's on the State health plan; other agency plans; legislation, rules, and regulations; and licensure and recertification. It was found that the best environment for a high impact SHPDa is an authoritative chain of leadership from a strong State governor to a strong health cabinet member, provided both are committed to provisions of the National Health Planning and Resources Development Act (Public Law 93-641). SHPDA's are more likely to have influence in a State where health services and resources are adequate.

HRP-0901931/6 PC **A06**/MF **A01**
Government Studies and Systems, Inc., Philadelphia, PA.
Evaluation of the Impact of SHPDAs (State Health Planning and Development Agencies) on the Activities of Other State Agencies. Final Report, Volume I.
Jun 79, 120p
Contract PHS-HRA-232-78-0084
See also Executive Summary, HRP-0901930, and Final Report, Volume 2, HRP-0901929.

The main goal of this study was to evaluate factors that enhance or reduce the impact of State health planning and development agencies (SHPDA's) on activites of other agencies and units in State government and on other organizations and groups interested in the State health system. The impact of SHPDA's on the State health plan; other agency plans; legislation, rules, and regulations; licensure and certification; coordination and mutual support; and perceptions of the attitudes toward planning and SHPDA's was identified. Variables susceptible to control or change in the environment of SHPDA's were budget characteristics, experience and credentials of staff, staff commitment, liaison efforts, regulatory activities, formal coordination agreements, and structural characteristics in the State and the SHPDA. Variables beyond the direct control of SHPDA's were political tenure, health system resources and expenditures, and demographic characteristics. It was postulated that these variables systematically increase or decrease the impact of SHPDA's and represent organizational or operating characteristics which can be manipulated to enhance the influence of

SHPDA's. This hypothesis was investigated in 15 States. Factors affecting the impact of SHPDA's were characteristics of the State governor or senior health official of the State and health system characteristics, as well as other factors. Recommendations to strengthen SHPDA's are offered, and supporting exhibits are provided.

HRP-0901974/6 PC **A25**/MF **A01**
Upper Peninsula Health Systems Agency, Inc., Marquette, MI.
Health Systems Plan for 1979. Health Service Area 8 Michigan. Second Edition.
Nov 79, 586p
See also AIP 1979, HRP-0901975.

The health systems plan (HSP) of the Upper Peninsula Health Systems Agency, Inc., in Marquette, Mich., opens with a summary of priority goals and objectives and recommended health status and health system actions. The preamble addresses the legal basis of health planning, the mission of the agency, purposes and use of the HSP, and relationships between health planning agencies and systems. The plan development process is outlined, with consideration given to Federal and State priorities. Regional characteristics of the health service area are assessed. Health status encompasses mortality due to all causes, coronary disease, cancer, cerebrovascular disease, diabetes, end-stage renal disease, infant mortality and natality, alcohol and substance abuse, motor vehicle accidents, dental disease, venereal disease, communicable disease, occupational fatalities, and domestic violence (child and spouse abuse). The health system covers community health promotion and protection (health education and environmental quality management), prevention and detection (immunization, multiphasic screening, dental screening, and maternal and child health), diagnosis and treatment (acute care, emergency medical services, substance abuse services, and mental health), habilitation and rehabilitation (long-term care and home health care), maintenance (end-stage renal disease hemodialysis), personal health care support services, and health system enabling services (physician manpower, physician extenders, and dental manpower). Attention is paid to health care costs and unique needs of the area. A bibliography, a glossary, and an index are included.

HRP-0901975/3 PC **A03**/MF **A01**
Upper Peninsula Health Systems Agency, Inc., Marquette, MI.
Annual Implementation Plan for 1979. Health Service Area 8 Michigan.
Nov 79, 39p
See also HSP 1979, HRP-0901974.

This annual implementation plan (AIP) culminates the planning process of the Upper Peninsula Health Systems Agency, Inc., in Marquette, Mich., and identifies important goals likely to affect the health status of the areas residents. As a document describing desired changes in the community to improve health status and/or the environment, the AIP contains objectives directly linked to long-range recommended actions in the health systems plan. Introductory remarks concern the legal basis of the AIP, the purpose of the AIP, and the objective prioritization process to facilitate resource allocation relative to five criteria categories (health status, health system, health care consumers, health planning concerns, and cost considerations or required resources). AIP objectives focus on emergency medical services (cardiopulmonary resuscitation training), recruitment of physicians (addition of at least one primary care practitioner by 1981), the availability of multiphasic screening services, and long-term care (patient discharge planning and physical therapy services).

HRP-0902005/8 PC **A13**/MF **A01**
Educational Testing Service, Princeton, NJ.
A Course on an HSA Executive Director's Critical Tool: Evaluation. Part I. Programs. Part II. Case Studies.
1979, 291p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System.

Programs and case studies to depict the role of evaluation in health systems agency (HSA) management comprise this course. Because the success of HSA's largely depends on the quality of management and on the factual base of decision-making, the course is designed to help HSA executive directors make systematic evaluation a viable tool in agency management. Four specific course goals are to help HSA executive directors: understand and utilize available techniques and materials in promoting agency self-evaluation; apply organizational evaluation skills to the analysis of agency functioning; apply principles of program evaluation and incorporate these principles in program planning; and be aware of the general function of evaluation, obstacles to effective evaluation, and strategies for ongoing evaluation. Programs in the course consider agency self-evaluation, organizational evaluation, evaluation in practice, and making evaluation work in HSA's. General instructions for trainers and case studies are included.

HRP-0902014/0 PC **A99**/MF **A01**
Educational Testing Service, Princeton, NJ.
A Course on a Systems Approach to Health Plan Development. Leader's Guide.
1979, 643p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational Systems.

A course based on a systems approach to health plan development is presented. Because health systems plans are never complete, the course is intended to improve skills of health planners. Specific goals are to understand the systems approach to health planning (National Health Planning and Resources Development Act, the system development process, and the relation between health systems plans and other plans), to understand and apply Federal and State controls and priorities as they affect health planning, and to present major components of the plan development process and ways of managing and implementing the process. Areas of concern in the development of technical expertise are the assessment phase of the health planning process, goals and objectives, criteria and standards, the establishment of priorities within the context of community involvement, long-range recommendations in light of system interactions, existing and required resources for plan implementation, and principles and processes associated with plan-program evaluation. Instructional activities are practice-based, focusing on individual agency needs and situations. Consideration is given to health status and health system assessment and the health systems plan document.

HRP-0902203/9 PC **A04**/MF **A01**
Health Research and Educational Trust of New Jersey, Princeton.
Military Experience Directed into Health Careers (MEDIHC). (New Jersey Operation MEDIHC). Final Report.
Rept. for 30 Sep 77-30 Sep 79,
Thomas Gallagher, Barry Anderson, and Carolyn Wigley. 1979, 64p
Contract PHS-HRA-231-77-0063
See also HRP-0902204 and report dated 1975, HRP-0018134.

The MEDIHC Program was established to help alleviate a growing scarcity of qualified allied health personnel while, at the same time, providing a meaningful career continuation for medical personnel who were trained while serving in the military service. The Health Research and Educational Trust of New Jersey provided a state focal point of advice and assistance to returning health-trained veterans. Many veterans, (approximately 30-35%) were unaware of the counseling and referral services available to them through the New Jersey MEDIHC Program. These personnel received assistance as a result of publicity through the media and direct contact by the use of Veterans Administration printouts of recently separated service personnel. Telephone and personal interviews were also conducted. There was a definite need for this type of program in New Jersey.

HRP-0902204/7 PC **A02**/MF **A01**
Health Research and Educational Trust of New Jersey, Princeton.
Military Experience Directed into Health Careers (MEDIHC). (New Jersey Operation MEDIHC). Executive Summary of Final Report.
Rept. for 30 Sep 77-30 Sep 79,
Thomas Gallagher, Barry Anderson, and Carolyn Wigley. 1979, 20p
Contract PHS-HRA-231-77-0063
See also HRP-0902203.

Operation MEDIHC was a cooperative program by the Department of Health, Education, and Welfare, the Department of Defense and the State of New Jersey, to help Vietnam-era veterans trained in health skills while in the military service; to capitalize on those skills when they return to civilian life. The goal of the Program was to help find civilian career opportunities and to provide free counseling and vocational guidance to veterans in their transition into civilian health careers. MEDIHC received presidential sanction and thus assumed considerable importance in both private and public sectors of the health industry. The number of medically trained veterans released annually from the armed forces continued to increase each year from 1971 through 1976 and gradually declined through 1979.

HRP-0902209/6 PC **A03**/MF **A01**
Missouri Center for Health Statistics, Jefferson City.
Missouri Nursing Homes, 1978.
Nov 79, 34p PUB-3.4
Contract PHS-HRA-233-78-2026

At the end of 1978, more than 32,000 Missourians resided in the state's professional and practical nursing homes. Residents included a small percentage of younger persons but about 90 percent were age 65 or older. Most older people, of course, are not confined to nursing homes or other institutional settings. Only about five percent of the state's residents age 65 and over are housed in long-term care facilities such as nursing homes. Despite the relatively small percentage of elderly who depend upon nursing homes for care, the importance of such facilities should not be minimized. This is particularly true since Missouri's elderly population is increasing. At state and national levels alike considerable attention has been directed recently toward nursing homes and related types of facilities that provide nursing and residential care to the aged, the infirm and the chronically ill. This report will focus on more basic factors such as geographic distribution of homes and beds, availability of Medicare- and Medicaid-certified homes, and how these and other factors relate to utilization. Historical data will also be presented to give the reactor a more complete perspective.

HRP-0902210/4 PC **A05**/MF **A01**
South Carolina Office of Cooperative Health Statistics, Columbia. Div. of Research and Statistical Services.
Pharmacists and Assistant Pharmacists, South Carolina, 1980.
Jan 80, 85p
Contracts PHS-HRA-233-79-2154, PHS-HRA-233-79-2058

The survey of pharmacists was conducted as a part of the 1979-1980 license re-registration process, with the questions incorporated into the re-registration application. Geographic location of employment in pharmacy for those active pharmacists not indicating a location was assumed to be the county of residence. Primary setting of employment was determined by choosing that setting in which the pharmacist indicated the majority of his working hours were spent. Non responses have been included in a category 'Other and not stated'.

HRP-0902211/2 PC **A04**/MF **A01**
North Central Georgia Health Systems Agency, Inc., Atlanta.
An Analysis and Inventory of Rehabilitation Services in Area III,
William J. Neugroschel. May 80, 52p
Grant PHS-HSA-04-P-000219-04

During the development of the 1980 NCG-HSA Health System Plan, staff noted that existing rehabilitation resource inventories did not provide the range of information needed for adequate planning in this area. In fact, the HSA was not able to determine the number of rehabilitation agencies in Area III. Following the determination of the need for such an inventory, it was decided that the NCG-HSA would collect and compile the needed information. For the purpose of this inventory, rehabili-

tation services are defined as restorative services in the areas of audiology, independent living skills, infant stimulation, occupational, physical, and speech therapies, personal counseling/therapy, psychological testing/evaluation, recreation/play therapy, resocialization therapy, vision therapy, and vocational rehabilitation. Section II of this study details study methodology, while Section III presents findings regarding reporting period, type of ownership, area served, caseload characteristics, sources of income referral sources, service offered, waiting list, and limitations of the data. Appendix A consists of an inventory of reporting rehabilitation agencies by county of location. This inventory should be extremely helpful as a resource directory for human services providers in the area, and as a planning tool.

HRP-0902212/0 PC **A07**/MF **A01**
Southeastern Wisconsin Health Systems Agency, Inc., Milwaukee.
Implementation Plan for Radiation Therapy Services in Southeastern Wisconsin.
Dec 79, 127p
Grant PHS-05-P-000211-03
Revision of report dated December 1978 and August 1979.

Implementation plans give documented direction to both planning bodies and service providers for the future delivery of specific health services in the region. This plan reviews existing radiation therapy services and makes recommendations relative to how services should be distributed in the region to meet identified needs over the next five years(1978-1983). The plan identifies those institutions which should provide radiotherapy services, the level at which services should be provided and the future role of these institutions in the regional service network. The recommendations also describe those activities which should be undertaken by specifically-named providers to bring the service system to an optimum functional level.

HRP-0902213/8 PC **A06**/MF **A01**
Michigan Cooperative Health Information System, Lansing.
Michigan Health Occupations, 1978.
Mar 80, 113p
Contract PHS-HRA-233-79-2052

A continuing survey of licensed health occupations is carried out by the Michigan Department of Public Health in cooperation with the Department of Licensing and Regulation and the licensure boards of the professions covered, as part of the Michigan Cooperative Health Information System (MCHIS). The types of information included are: basic data about the licensees such as date of birth, sex, race, and educational background; and data related to professional employment such as location, type of employer, work setting, specialty or principal type of practice, and types of activity. Employment-related data are collected periodically, through a questionnaire included with license renewal applications. Responses are processed for computer access by the Department of Public Health, and are used for summary statistical purposes only. Approximately 90 percent of the licensees in each occupation have participated in the survey.

HRP-0902215/3 PC **A03**/MF **A01**
Nebraska State Dept. of Health, Lincoln. Div. of Health Data and Statistical Research.
Nebraska Health Manpower Reports: Nebraska Pharmacists 1978.
1978, 41p
Contract PHS-HRA-233-78-2140
See also HRP-0025982.

This statistical report of Nebraska Pharmacy Manpower was compiled from questionnaires mailed to all Pharmacists licensed by the State of Nebraska as of February 1, 1978. Similar surveys and reports are produced annually for thirteen health professions by the Division of Health Data and Statistical Research, in order that timely, reliable, and comparable data concerning the supply, distribution, and other characteristics of health manpower in Nebraska may be made available to interested organizations and individuals within the State. In addition, information derived from these surveys is transmitted to the National Center for Health Statistics, a part of the Department of Health, Education, and Welfare, for inclusion in the Cooperative Health Statistics System at the national level. This report contains primarily summary data relating to Nebraska Pharmacists in 1978.

HRP-0902216/1 PC **A04**/MF **A01**
Michigan Cooperative Health Information System, Lansing.
Health Facilities - Hospitals, Nursing Care Facilities, and Homes for the Aged, Michigan, 1977.
Mar 80, 75p
Contract PHS-HRA-233-78-2132

This report, the fourth in the MCHIS series on health facilities, presents data on the characteristics of hospitals (excluding federal hospitals), nursing care and related facilities, and homes for the aged in Michigan in 1977 (1). In all, 225 general hospitals, 22 psychiatric hospitals, 41 county medical care facilities, 132 homes for the aged, and 383 nursing homes are included. Limited data are also included for the 12 developmental disabilities centers operated by the state Department of Mental Health. The characteristics described in this report include number of facilities and beds, utilization rates, type of ownership, services and programs provided (inpatient and outpatient), Medicare and Medicaid certification, and staffing. The principal source of data for the report was the annual survey of health facilities carried out by the Department of Public Health's Division of Health Facility Planning and Construction, Bureau of Health Care Administration, in conjunction with the Michigan Cooperative Health Information System. Data for calendar year 1977 were collected through a questionnaire mailed to all facilities during March, 1978. Copies of the questionnaire and instructions are included in Appendix III.

HRP-0902217/9 PC **A02**/MF **A01**
Professional Examination Service, New York.
Examination Development for Environmental Health Personnel.
Executive summary rept. 1 Oct 78-30 Apr 80,
Craig G. Schoon. 30 Apr 80, 8p
Contract PHS-HRA-232-78-0146
See also Final report, HRP-0902218.

The purpose of this project was to develop three technician forms and three technologist forms of a criterion-referenced examination to assess entry-level proficiency in environmental health. To this end, item pools assessing the knowledge and skill statements listed in the five competency domains of the Blueprint of the Knowledges, Skills, and Attributes for Environmental Health Practitioners (NEHA, 1979) were developed. The Blueprint document was an outcome of the Role Delineation and Verification project conducted by the National Environmental Health Association.

HRP-0902223/7 PC **A03**/MF **A01**
Washington Univ., Seattle. Dept. of Health Services.
The National Health Service Corps: Rapid Growth and Uncertain Future.
Health policy research series,
Roger A. Rosenblatt, and Ira S. Moscovice. Feb 80, 47p DISCUSSION PAPER-15

The National Health Service Corps (NHSC) has grown rapidly since its inception in 1971. As the program has grown in size, there have been profound changes in its operation and administration. Concommitant with this rapid programmatic evolution have come major shifts in program policy, shifts mediated as much by far-reaching administrative decisions as legislative mandate. The addition of a scholarship component--begun in 1973 and expanded in 1976--increased the federal commitment, insured a steady future stream of potential assignees, and greatly increased the complexity of the program. Evaluation of the program--both as a tool to maintain accountability to legislative intent and as a mechanism for improving program operations--has lagged behind the rapid changes in the way the program functions. The major thrust of this paper is to describe the history and operation of the NHSC, to review previous research related to the program, to identify the major policy issues surrounding the program, and to discuss the future of the NHSC.

HRP-0902254/2 PC **A23**/MF **A01**
Southwest Alabama Health Systems Agency, Mobile.
Health Systems Plan for 1980-1984. Health Service Area 6 Alabama. Fourth Edition.
21 May 79, 539p
Grant PHS-04-P-000207-04-1
See also AIP 1980, HRP-0902255.

On behalf of the Southwest Alabama Health Systems Agency we are happy to present to the people of this region the fourth edition of the Health Systems Plan (HSP), a document outlining directions which new developments in the health care system should take in order to effectively and efficiently meet the unique health care needs of the residents of the 13 counties in Southwest Alabama. With each new edition, the HSP has become more and more detailed in its descriptions and analyses of existing health status and health care system conditions and in its proposals of actions to accomplish goals and objectives for the improvement of the health of persons living in the region. These refinements are possible only through the continued and growing support from consumers and providers of health care for local health planning.

HRP-0902255/9 PC **A03**/MF **A01**
Southwest Alabama Health Systems Agency, Mobile.
Annual Implementation Plan for 1980. Health Service Area 6 Alabama. Fourth Edition.
21 May 79, 32p
Grant PHS-04-P-000207-03-1
See also HSP 1980-84, HRP-0902255.

The Annual Implementation Plan is the articulation of desired achievements for improvement in the health status of area residents and in the services provided by the region's health systems for the coming year. It is based on the Health Systems Plan and has grown directly out of those HSP goals and objectives which were considered most important by the Plan Document Committee. The Annual Implementation Plan's recommended actions are designed to fulfill those aspects of the HSP which the Southwest Alabama area can accomplish within one year. By identifying specific short range actions, community agencies will be able to direct their resources in a coordinated effort to improve the health status of Southwest Alabama residents. In addition to becoming the area's annual plan for health actions, the AIP will be utilized by the Southwest Alabama Health Planning Council in performing the following functions, mandated by P.L. 93-641.

HRP-0902256/7 PC **A04**/MF **A01**
East Tennessee Health Improvement Council, Inc., Knoxville.
Annual Implementation Plan 1980-1981. Health Service Area 2 Tennessee.
1980, 52p
Grant PHS-04-P-000233-04-0
See also HSP 1979-84, HRP-0902257.

As part of the health planning and resources development process outlined by Congress in P.L. 93-641, each health systems agency is required to develop an Annual Implementation Plan (AIP). According to P.L. 93-641, the AIP should describe 'objectives which will achieve the goals of the Health Systems Plan (HSP) and priorities among the HSP objectives. In establishing the AIP, the agency shall give priority to those objectives which will maximally improve the health of the residents of the area, as determined on the basis of the relations of the cost of attaining such objectives to their benefits, and which are fitted to the special needs of the area'. (P.L. 93-641, Section 1513 (b) (3)). The HSP and the AIP are companion documents. As the HSP outlines in broad strokes the goals of an ideal health system for East Tennessee, so the AIP details short-range objectives and recommended actions which should be accomplished in the course of one year. Each year ETHIC will complete an AIP and set priorities for action. Taken over time, completion of each year's AIP objectives will lead to the ultimate achievement of the goals and objectives of the HSP.

HRP-0902257/5 PC **A14**/MF **A01**
East Tennessee Health Improvement Council, Inc., Knoxville.
Health Systems Plan for 1979-1984. Health Service Area 2 Tennessee. Third Edition.
1979, 324p

Grant PHS-04-P-000233-04-0
See also AIP 1980-81, HRP-0902256.

The East Tennessee Health Improvement Council (ETHIC) is one of 202 health systems agencies (HSAs) established by the National Health Planning and Resources Development Act of 1974 (Public Law 93-641). The intent of Congress in creating the health systems agencies was to provide a foundation for local health planning and resources development efforts directed toward improving the health of Americans, improving the health services being provided and restraining increases in the cost of providing these services. While ETHIC was officially designated on April 30, 1976, as the health systems agency serving 16 counties in East Tennessee, it continues and expands the work of the East Tennessee Health Planning Council begun in 1971. ETHIC is a private, non-profit organization directed by a 57 member board of directors, broadly representative of the population of the members, 29 are consumers of health services, and the remaining 28 members are providers. The Governing Board has five standing committees, one of which, the Plan Development and Implementation Committee (PDIC), is responsible for directing the overall plan development efforts of the Agency. It, like the Governing Board, has a consumer majority. Under the direction and guidance of the PDIC, this health systems plan (HSP) was developed.

HRP-0902264/1 PC **A08**/MF **A01**
Institute of Medicine, Washington, DC.
Reliability of National Hospital Discharge Survey Data.
1980, 165p IOM-80-02, ISBN-0-309-03079-X
Contract DHEW-282-78-0163
Library of Congress catalog card no. 80-81950.

This report presents the findings of an assessment of the reliability of data collected as part of the National Hospital Discharge Survey (NHDS). The NHDS is conducted by the National Center for Health Staistics (NCHS) and is a major source of nationally aggregated hospital utilization data. The Institute of Medicine was asked by NCHS to conduct this study as part of the Center's continuing efforts to assure that accurate, timely, and high quality data are available to meet the health information needs of the nation. The NHDS is a voluntary survey that has been conducted since 1964 and is one of the major sources of nationally aggregated hospital discharge information for the total noninstitutionalized population. The data examined in this study are used to generate statistics on the utilization of all general and special non-federal, short-stay hospitals in the United States and on characteristics of patients who use those hospitals.

HRP-0902265/8 PC **A06**/MF **A01**
West Virginia State Dept. of Health, Charleston. Health Statistics Center.
Vital Health Statistics of West Virginia, 1978. Thirty-Second Annual Report.
1979, 122p
Contract PHS-233-79-2063

In 1978 several changes were initiated in the West Virginia Vital Statistics Registration System. Introduced on January 1, 1978 were (1) the Direct Reporting System for births and deaths and (2) new forms for reporting births and deaths. At that time it was determined that the local registrar reporting system was an uneconomical and inefficient method of vital record collection as nearly 100% of West Virginia births occurred in hospitals and the majority of non-hospital deaths came under the jurisdiction of the State Medical Examiner System. It was particularly appropriate to make the reporting system change in 1978, since the basic vital record reporting forms were scheduled for changes nationwide as of January 1, 1978. Good economy suggested that both the form changes and the change to direct reporting (which was dependent on certain report form changes) be made simultaneously. Therefore, a multicopy form of the birth and death reporting certificate was designed. This multicopy form included (1) the changes suggested by the National Center for Health Statistics as indicated in the revised U. S. Standard Certificate of Birth, and the U. S. Standard Certificate of Death; and (2) the reporting form changes necessary to implement the direct reporting system.

HRP-0902266/6 PC **A03**/MF **A01**
Chase, Rosen and Wallace, Inc., Alexandria, VA.
A Decade of Dental Service Utilization, 1964-1974.
1979, 44p
Contract PHS-HRA-231-77-0057

This report is concerned with the analysis of the 1974 data to yield information relative to consumer dental utilization and provide further insight pertaining to future expansion of prepaid dental care within the context of public policy goals and access to dental care. This study will attempt to identify and explain changes that have occurred since 1974 and to introduce data on dental prepayment plans as a factor influencing utilization.

IAEA-R-1573-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Differential Diagnosis of Hepatitis and Space Occupying Lesion of the Liver by Radioisotope Techniques on Cases Commonly Seen in Rangoon General Hospital, Burma. Final Report for the Period 15 December 1974--31 December 1977.
Jan 78, 37p
U.S. Sales Only.

The aim of undertaking was, to promote in-vitro measuring techniques as well as in-vivo measurements of organs using imaging techniques. Se-75 and In-113 have equal ability to prove the presence of abscesses or cysts. For the detection of tumors their usefulness is doubtful. (Atomindex citation 10:437614)

IEA-DT-053 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Determination of Cortisol in Blood Plasma by Isotopic Dilution.
Tese (M.Sc.),
T. Shimizu. May 78, 25p
In Portuguese.
U.S. Sales Only.

A method to measure cortisol in blood plasma is developed using tritium as a tracer. Thin-layer chromatographer is used for very accurate separation and determination of cortisol free of impurities. Results show a concentration of 14,02+-5,79 mu g/100ml for cortisol in blood. This method appears to be especially useful when interfering substances are present. (Atomindex citation 10:430172)

IEA-DT-077 PC **A03**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Study of the Hypothalamic - Hypophyseal - Thyroid Axis by the Administration of TRH to Chagas' Disease Patients.
Tese (M.Sc.),
N. M. A. Abelin. Sep 78, 36p
In Portuguese.
U.S. Sales Only.

The TSH and T sub 3 response to synthetic TRH was evaluated in two groups of patients: normal and with Chagas' disease, from the urban area of Sao Paulo (Brazil). Plasma T sub 4 , PBI and TSH values were within the normal range, when compared with those found in the controls: so were the thyroid uptakes of 2 and 24 hours; the basal levels of T sub 3 where within the normal range except in three subjects whose values were higher than normal. After TRH administration the amount of TSH secretion in patients with Chagas' disease was increased when compared to normal ones, while T sub 3 secretion was unaltered. It is suggested that in the Chagas' disease there is an increase in the pituitary TSH, while the thyroid reserve is preserved. This increase could be due to a difference in the regulation rate of TRH, which is determined by the neuronal degeneration caused by the disease itself. (Atomindex citation 11:496827)

INIS-mf-4137 PC **A06**/MF **A01**
Department of Atomic Energy, Bombay (India).
Draft Report on the National Seminar in Nuclear Medicine.
1977, 110p
U.S. Sales Only.

The proceedings of the seminar on nuclear medicine have been conducted in four main sessions. In the first session a review of the current status of clinical nuclear medicine in India is reviewed. The use of radioisotopes in thyroid function studies, central nervous system studies, liver disorders, lung and bone imaging, renal function studies, dynamic function studies, gastroenteroloy, and hematology are described. The existing facilities and the future needs for radioimmunoassay and radiotherapy are discussed. In Session 2, the existing facilities in nuclear medicine in different states in India are reviewed. In Session 3, the available resources in nuclear medicine are reviewed, radiation protection procedures are outlined and, various nuclear instruments developed at the Bhabha Atomic Research Centre, (BARC), Bombay, for use in nuclear medicine are briefly described. A list of radiopharmaceuticals developed by BARC and in current use, is given. The roles of the physicist, pharmacist, and the nuclear medicine technologist in the hospitals having nuclear medicine units, are stressed. The importance of training and education for personnel in nuclear medicine and medical physics is pointed out. (Atomindex citation 09:376180)

INIS-mf-4298 PC **A04**/MF **A01**
Universidade Federal do Rio de Janeiro (Brazil). Inst. de Biofisica.
Contributions to the Study of Albumins from Thyroid.
M. Netto. 1975, 67p
In Portuguese.Thesis.
U.S. Sales Only.

Seventy two human thyroids were analyzed from which 27 corresponded to normal tissue, 30 to nodular goiters(21 cold nodules and 9 hot nodules), 10 to adenocarcinomas, 3 to ganglionar metastasis of thyroidal adenocarcinoma, and 2 to Hashimoto's thyroiditis. The concentration of total albumin and serum albumin were determined in these tissues thus permitting the estimation of thyralbumin concentration. The results obtained showed a significantly higher concentration of thyralbumin as compared to serumalbumin in all tissue samples. A significant correlation between the content of blood in the thyroid extracts and its concentration of thyralbumin was also found. The hypothesis that thyralbumin was produced in the gland was therefore accepted. Furthermore, the thyralbumin content of abnormal tissues was always higher than that found in normal thyroids. (Atomindex citation 09:386178)

INIS-mf-4323 PC **A05**/MF **A01**
Ceskoslovenska Komise pro Atomovou Energii, Prague.
Methods for Checking Radioimmunoassays.
V. Karlicek, O. Topolcan, and M. Zavada. 1977, 86p
In Czech.
U.S. Sales Only.

TL. (Atomindex citation 09:404828)

INIS-mf-4350 PC **A04**/MF **A01**
Munich Univ. (Germany, F.R.). Fachbereich Medizin.
Differentiation of Scintigraphic-Morphological Changes of the Thyroid by Diffusion Techniques.
Diss. (M.D.),
T. Auf Hamada. 12 Mar 74, 52p
In German.
U.S. Sales Only.

The possibility of obtaining a diagnostic parameter by determining the thyroidal blood circulation with the aid of gamma-camera examination was studied. A series of confirmed cases of hyperthyreoses, adenomas, cycts, and malignomas was selected trying to distinguish the criteria of the blood circulation of clinically, serologically, and scintigraphically normal organs. The blood circulation of the normal-sized, or slightly enlarged thyroid showed in all cases a normal curve with constant increase, but without a peak during the period of examination (60 sec.). The curve in the case of hyperthyreosis, in contrast to the normal findings, demonstrates a notably faster accumulation of the nuclide in the thyroid, with a slightly reduced enrichment in the further course of the examination, in comparison to the initial part of the curve. The blood circulation curves of decompensated adenomas show, in contrast to the compensated adeno-

ma, also a faster initial accumulation, in relation to the total height of the impulse, which is quantitatively increased by 1/3. If all adenomasare compared, the curve is seen to ascend continously, although only in two of seven cases a peak could be differentiated, which might be due to a faster thyroid clearance. (Atomindex citation 09:395205)

INIS-mf-4383 PC **A08**/MF **A01**
Tuebingen Univ. (Germany, F.R.). Fachbereich Klinische Medizin.
Quantitative Whole-Body Skeleton Scintiscanning, Kinetics and Clinical Importance.
K. Anger. 1975, 170p
In German.Habil. Schr.
U.S. Sales Only.

The method of quantitative whole-body skeleton scintiscanning is presented along with some preliminary results. The method has two characteristic features: 1) Consequent application of the princple of quantitative scintiscanning, with double-detector scanner, attenuation, and organ thickness correction. In a digital whole-body skeleton scintiscan, the impacted total activity, the relation between skeleton, organ, and soft tissue activity, and the activity distribution in percent over skeleton sections and scintiscan increments with a diameter of 5 x 5 cm can be determined by this method with a measuring error below 10%. 2) Comparison with a standardized normal skeleton scintiscan obtained with sup(99m)Tc-Sn-pyrophosphate 4 to 6 h p.i. from 33 scintscans of persons of different age and sex. This comparison gives a local quotient of enrichment which is a direct measure for the increase in metabolic activity. (Atomindex citation 09:398453)

INIS-mf-4544 PC **A09**/MF **A01**
Universidade Federal do Rio de Janeiro (Brazil). Inst. de Biofisica.
Thyrocalcitonin: Its Importance on the Regulation of the Plasmatic Levels in Total Thyroidectomy.
Thesis,
J. Fridman. 1975, 176p
In Portuguese.
U.S. Sales Only.

The effects of thyrocalcitonin on blood, calcium and phosphorus were studied. Twelve patients with adenocarcinoma of the thyroid, previously submitted to total thyroidectomy and complementary radioiodine therapy, were studied. (Atomindex citation 09:417676)

INIS-mf-4711 PC **A02**/MF **A01**
Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro.
Normal Values of Iodine - 131 Uptake in 24 Hours, in Rio Grande Do Norte, Brazil.
T. F. de Oliveira Filho, and C. F. F. de Oliveira. 11p
In Portuguese.
U.S. Sales Only.

Thorough clinical examinations were conducted on all patients coming to the radioisotope Laboratory at UFRN, attempting to select those patients with clinically normal thyroids. After tests for hypo- and hyperthyroidism were carried out, 100 patients were considered to be fit for the research. All of them had an impalpable and asymptomatic thyroid. Waynes clinical indices were precisely revealed in 93% of cases. It was concluded that the normal values of uptake of exp 131 I during the 24 hours in RGN varied between 14% and 44%. (Atomindex citation 10:430170)

INIS-mf-4750 MF **A01**
Erasmus Univ., Rotterdam (Netherlands).
Variations in Thyroid Functions Following the Development of Cancer Consequent to Neck Irradiation.
R. J. T. M. Bleker, and T. H. A. Bikkers. Jun 78, 73p
In Dutch.
U.S. Sales Only. Microfiche copies only.

The authors describe the results of thyroid irradiation tests, which include the TRH test (TRH = thyroid stimulating hormone), and results are quoted on a group of 43 patients, of various ages. Details are included of the medication in each case. Other tests applied include ECG x radiography, studies of the accumulation of antibodies near the thyroid, immuno-electrophoretic surveys, and I-131 by scanning of a radioactive tracer. The tracer activity is checked at intervals of 5, 24 and 48 hours. (Atomindex citation 10:433015)

INIS-mf-4801 PC **A05**/MF **A01**
Rio de Janeiro Univ. (Brazil). Inst. de Biofisica.
Developed and Applications of a Method for Dose Comparasion of Cobalt 60 Sources Used in Radiotherapy.
Tese (M.Sc.),
J. L. B. Leao. 1975, 84p
In Portuguese.
U.S. Sales Only.

IAEA and WHO developed a postal intercomparison program for measuring the output of Co-60 therapy units all over the world. This work reports first results of an modified postal intercomparison based on the IAEA/WHO program. A mailable 10 x 10 x 10,5cm Mix-D phantom with embedded TLD dosimeters, films and field markers of lead, and a questionary were developed to obtain not only information regarding the output of Co-60 therapy machines but also to get information about alignment, field homogeneity, dose calculations, field size, and surface dose. This program was field tested in 10 different radiotherapy centers. The results of this intercomparison indicated a range of absorbed doses from 78 rads to 127 rads for the 100 rads asked for at 5cm depth in the phantom. Variations in the prescribed fieldsize of 6 x 6cm were between 30cm exp 2 and 100cm exp 2 . In half of the cases, inhomogeneity of the radiation field was spotted. (Atomindex citation 10:441461)

INIS-mf-4839 PC **A07**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Exp 32 P Test and Other Methods in the Diagnosis of Intraocular Tumours.
Proefschrift (Dr.),
R. A. van Dijk. 13 Sep 78, 133p
U.S. Sales Only.

Why the exp 32 P test was reintroduced into The Netherlands for the diagnosis of intraocular tumours and how the present study was started is explained. The physical features of exp 32 P and the biochemical behaviour of radioactive phosphate in healthy and neoplastic tissue are described. The complications, which can be encountered after the administration of exp 32 P, are mentioned. A review of the exp 32 P test in ophthalmology is given, with special attention to the methods used and the development of instruments for the measurements. The way in which the exp 32 P test was performed in this study is described. The exp 32 P test results obtained in the patients of this study are described. A good diagnostic accuracy of the exp 32 P test was present in the 192 lesions located in the posterior segment, with a correct result obtained in 186 patients. Only three malignant and three benign lesions showed an incorrect test result. The results obtained with scintigraphy, fluorescein angiography, perimetry, transillumination, and ultrasonography are given and compared with data in the literature. The value of fluorescein angiography, perimetry, and the exp 32 P test for the diagnosis of various lesions, with relevance to the differential diagnosis of a choroidal tumour, is described. The exp 32 P tests performed in 12 patients with an extraocular lesion are mentioned. (Atomindex citation 10:445367)

INIS-mf-4840 PC **A06**/MF **A01**
Vrije Univ., Amsterdam (Netherlands).
Adrenal Scintigraphy. An Experimental Study and Clinical Application.
Proefschrift (Dr.),
E. A. van der Veen. 13 Jun 78, 108p
U.S. Sales Only.

The visualization of functioning adrenocortical tissue by scintigraphy became possible with the introduction of radioiodinated cholesterol derivatives. According to the literature, there is evidence that one of these iodinated cholesterols, 6- beta - iodomethyl-nor-cholesterol, concentrates in the adrenal cortex to a much greater extent than exp 131 I-19-odocholesterol. Results comparing both radiopharmaceuticals are described. The authors investigated the possibility of increasing the uptake of iodinated cholesterol using simultaneous ACTH and the 'cholesterol side-chain cleavage enzymeblocker': aminoglutethimide. The results of adrenal scintigraphy performed in 37 patients are described. Finally, the literature on adrenal scintigraphy is reviewed, and results reported in various studies are compared. (Atomindex citation 10:445422)

INIS-mf-4841 PC **A07**/MF **A01**
Utrecht Rijksuniversiteit (Netherlands).
Tumour Imaging with Non Specific Substances. An Ionic Model to Explain the Distribution Patterns of Tumour Imaging Radiopharmaceuticals in Normal and Pathological Tissues.
Proefschrift (Dr.),
W. B. van der Pompe. 8 Dec 78, 144p
U.S. Sales Only.

A short introduction concerning tumour imaging in nuclear medicine is given as well as the formulation of the problem treated in this thesis. In a literature review the most important tumour imaging radiopharmaceuticals used until now are described together with their clinical significance in the diagnosis of malignancy. The mechanism of uptake and subcellular distribution of most of the radiopharmaceuticals reviewed are discussed in chapter three with special reference to gallium-citrate. An ionic model to explain the distribution patterns of a number of these tumour imaging radiopharmaceuticals in normal and pathological tissues has been proposed. Evidence for the validity of this model is presented with specific reference to the ionic state of the reagents concerned. EXperimental evidence to support the proposed model is presented, with reference to the biologic behaviour of the radiopharmaceuticals in normal and pathological tissues. A limited number of selected case reports demonstrate how the results of the earlier described investigations can be applied to explain phenomena observed in clinical studies with ionic substances. The results obtained are discussed and the validity of the data with respect to the proposed model has been investigated. (Atomindex citation 10:445409)

INIS-mf-5174 PC **A08**/MF **A01**
Giessen Univ. (Germany, F.R.). Zentrum fuer Radiologie.
Selective Uptake Measurements of Thyroid Nodules with exp 132 I Before and after Pituitary Suppression with T4 and T3, Comparison with the TRH Assay.
K. Eitenmueller. 1977, 158p
In German.Diss. (D.M.D.).
U.S. Sales Only.

75 patients with suspected hormone-producing autonomous adenoma were examined by the extended TRH assay (BTSH determination, TSH rise 30 min. p.i., and T3 rise 120 min. p.i. 400 mu g TRH i.v.) and selective uptake measurements of three different areas of the thyroid using exp 132 I. The TRH stimulation test alone or the exp 132 I uptake test alone before and after suppression do not give a clear diagnosis. A clear differentiation of thyroid diseases is only possible if both tests are applied and their results are combined. For a differential diagnosis of nodular hyperthyroidism or autonomous adenoma, also the TSH stimulation test is necessary in addition to the combination of TRH test and suppression test. (Atomindex citation 10:473424)

INIS-mf-5176 PC **A06**/MF **A01**
Giessen Univ. (Germany, F.R.). Abt. fuer Nuklearmedizin.
Nuclear, Radiographic, and Bodyplethysmographic Studies on the Problem of Tracheal Constriction in Struma Patients.
B. Beringhoff, and I. M. Wolf. 1978, 114p
In German.Diss. (M.D.).
U.S. Sales Only.

In 42 patients with diffuse struma and 41 patients with nodular struma, thyroid scintiscans and tracheal pictures have been taken at two levels, and measurements of the tracheabronchial resistance have been carried out. The author investigates whether there is a correlation between thyroid scintiscan area and resistance or between relative tracheal constriction and resistance value or between thyroid area and relative tracheal constric-

ion in percent. In patients with nodular struma, the chi exp 2 test shows deviations from the null hypothesis of independence for scintiscan area and resistance, for relative tracheal constriction in percent and resistance, and for scintiscan area and tracheal constriction. (Atomindex citation 10:473334)

INIS-mf-5400 PC **A04**/MF **A01**
Marburg Univ. (Germany, F.R.). Medizinische Fakultaet.
Therapy of Degeneration Diseases.
H. M. Altmannsberger. 5 May 78, 55p
In German.Diss. (M.D.).
U.S. Sales Only.

The possibilities of radiotherapy in humeroscapular periarthritis, cervical, syndrome, gonarthrosis and coxarthrosis are described. The degenerative processes themselves can not be improved by the treatment; the main therapeutic goal therefore is alleviation of pain and normalisation of the metabolism. A questionnaire was sent to 303 patients who had been treated at Marburg university hospital between 1969 and 1973. 72% of the patients with humeroscapular periarthritis had been improved by the radiotherapy and 47% of the patients with cervical syndrome. On the other hand, only 38% of the patients with gonarthrosis and 21% of the coxarthrosis patients had been improved. (Atomindex citation 11:505462)

INIS-mf-5437 PC **A04**/MF **A01**
Freie Univ. Berlin (Germany, F.R.). Medizinische Fachbereiche.
Development of a Radioreceptor Assay for Human Chorion Gonadotropin: Application in Normal and Pathological Pregnancies.
R. Koch. 12 Jan 78, 55p
In German.Diss. (M.D.).
U.S. Sales Only.

Rats testes were homogenised, and the binding capacity of several dilutions of these were tested with iodine exp 125 -labelled human choriongonadotropin. Investigations about binding over a period of 36 hrs. with 3 different temperatures, inhibition tests and cross reaction analyses for determining the specificity were carried out. Two assay systems could be developed. The highly sensitive assay was applied at early pregnancy, at suspected disturbed or ectopic gravidity and allowed to measure the hCG-serum concentration above the physiological basal secretion of hLH. The less sensitive assay was used for measuring hCG in later stages of pregnancy, chorionepitheliomas and other hCG producing tumours. With the highly sensitive and specific assay, hCG was determinable 8 to 10 days post conceptionem. (Atomindex citation 11:505220)

JINR-18-11570 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Proton-Ion Radiography for Medical Diagnostics. Nuclear Scattering Radiography . . Review.
M. G. Shafranova, and M. D. Shafranov. 1978, 20p
In Russian.
U.S. Sales Only.

A new radiographic method (Nuclear Scattering Radiography) is described. Its physical foundation, potentialities, results of investigating the structure of some biological objects, including human tissues, are given. The method is based on the use of proton-proton elastic scattering and proton quasi-elastic scattering on nuclei at 600-1000 MeV energies. This method widely takes advantage of potentialities of a modern physical experiment. To derive an information concerning the character of interaction and the coordinates of particle passage the drift or proportional chambers, as well as scintillation counters are utilized. The computer realizes the control for apparatus operation and data collection. The position of an interaction point is reconstructed by using the particle passage coordinates. The event number depends on the density of matter. The hydrogen events and interactions with nuclei could be separated, thus it is possible to get both "hydrogen" and "ordinary" radiograms. The method permits to obtain a new independent diagnostical information on the object structure. The optimization of experiment and increasing arrangement operation speed permits to lower considerably a radiation dose and exposition time. (Atomindex citation 10:442040)

KFK-2718 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Medizinische Abt.
Guideline Study on the Medical Infrastructure in Case of Serious Accidents of Nuclear Power Stations.
L. Ohlenschlaeger. Oct 78, 17p
In German.
U.S. Sales Only.

Based on a guideline study an organizational chart will be discussed of medical infrastructure in case of serious accidents occuring in nuclear power stations. The organizational chart provides for medical action taken on three different levels: 1. first aid stations, 2. basic hospitals, 3. specialized hospitals. The first aid stations are charged with differentiating admitted persons on the basis of physical measured data as well as case history details and clinical data. The persons to be assessed clinically are grouped into the categories of 'light radiation accidents', 'medium radiation accidents', and 'serious radiation accidents'. These sorting criteria are used to transfer cases involving radiation accidents to collecting and evacuation stations, respectively, basic hospitals or specialized hospitals. Symptoms of radiation accidents are discussed which can be included in the criteria of differentiation used to classify by light, medium, and serious radiation accidents. Besides, the report deals with measures accompanying the organization of functions in a first aid station as well as between the three levels indicated in the organizational chart. (Atomindex citation 10:441305)

KFKI-1977-75 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Ion Content of Synaptic Vesicles.
I. Demeter, L. Keszthelyi, Z. Szokefalvi-Nagy, L. Varga, and K. Hollos-Nagy. Sep 77, 8p
U.S. Sales Only.

Proton induced X-ray emission analysis measurements were performed to determine the P, S, K, Ca, Fe, Ni, Cu, and Zn ion content of presynaptic vesicles prepared from guinea-pig cortex brain. The number of different ions per single vesicle is calculated using results of the additional protein content determinations. The ion content of cholinergic and adrenergic vesicles are compared. Some rough conclusions can be made regarding the biochemistry of vesicles on the basis of this measurements, but the elucidation of the meaning of the data needs further work which will demonstrate the value of PIXE-type investigations in similar studies. (Atomindex citation 10:436139)

NPRU-78/5 PC **A02**/MF **A01**
University of the Witwatersrand, Johannesburg (South Africa).
Oesophageal Cancer in the Transkei: Multi-Elemental Investigation of the Plant Material and Water. Mid-1978 Progress Report.
B. D. Drennan, R. J. Keddy, and J. P. F. Sellschop. 3 Aug 78, 8p
U.S. Sales Only.

A programme which investigates possible environmental factors which may have an effect on the demographic distribution of oesophageal cancer in the Transkei, has been initiated. This report describes the first phase of the project which deals with the analysis of the variation of trace elements along the length of maize leaves by activation analysis. (Atomindex citation 09:410501)

N80-27981/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Experimental Gastric Ulcers Induced by Immobilization and Electric Shock of Rats and Their Pharmacotherapy.
O. N. Zabrodin. May 80, 7p NASA-TM-76157
Contract NASW-3199
Transl. Into English from Farmakol. Toksikol. (USSR), V. 28, No. 6, 1965 p 717-719. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The mechanism of development of experimental gastric ulcers, induced in rats by combined immobilization and electric shock, was analyzed pharmacologically with peripheral neurotropic agents. It is concluded that: (1) The most marked preventive effect in the development of the experimentally induced gastric ulcers was displayed by agents capable of blocking the ascending activation system of the reticular formation. (2) Sympathetic fibers, which disrupt the trophism of the gastric wall, form the efferent portion of the reflex arc. (3) Gastric secretion does not appear to be the primary cause of ulceration.

N80-27992/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effects of Hypodynamia on the Hemocoagulative Properties of the Vascular Wall and Myocardium.
V. I. Inchina. Jun 80, 9p NASA-TM-76199
Transl. Into English from Kardiologiya (USSR),V. 18, No. 3, Mar 1978, p 126-129. Transl. By Kanner Leo Associates, Redwood City, Calif.

The hemocoagulative properties of the aorta (laminar), myocardium, hollow veins, and fibrinolytic capacity of tissues were studied in 14 rabbits subjected to 7 days of restricted mobility and compared to those of 10 control animals. Two tables of results show that, as a result of hypodynamia, the thromboplastic activity of the inner and middle layers of the aorta together with the destruction of endothelium increases the hemocoagulative potential and creates the threat of thrombogenesis. There is also an increase in fibrin-stabilizing activity for all tissues.

N80-28043/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Vertebral Pain in Helicopter Pilots.
R. Auffret, R. P. Delahaye, P. J. Metges, and Jun 80, 19p NASA-TM-75792
Contract NASW-3199
Transl. Into English of "Les Algies Vertebrales des Pilotes d'Helicopteres", Rept. Agard-Cp-255, AGARD, Paris, Dec.1978 7 p. Translation Was Announced as N79-19656. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Pathological forms of spinal pain engendered by piloting helicopters were clinically studied. Lumbalgia and pathology of the dorsal and cervical spine are discussed along with their clinical and radiological signs and origins.

N80-28046/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Results of the Investigation of the Otolith Function in Manned Space Flights.
L. N. Kornilova, G. D. Syrykh, I. K. Tarasov, and I. Y. Yakovleva. Jun 80, 9p NASA-TM-76103
Contract NASW-3198
Transl. Into English from Vestn. Otorino-Laringol. (USSR), No. 6, 1979 p 21-24. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By USSR Ministry of Health, Moscow.

The effects of conditions of long term and short term space flights on the otolith function of cosmonauts were investigated via pre and post examinations. The results show that after long term flight, the intensity of the otolith reflex increased and asymmetry occurred in the indicators of the otolith function. Large changes in terms of expression and duration in the indicators of the otolith function after long term flight as compared with short term flight were also noted.

PAT-APPL-6-100 496 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
N-Acetyl-Cysteine Protects Against Cardiac Damage from Subsequently-Administered Cardio-Toxic Anthracycline in Cancer Therapy.
Patent Application,
Charles E. Myers, James H. Doroshow, and Gershon Y. Locker. Filed 5 Dec 79, 13p PB80-206705
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The cardiac damage, occurring after treatment with an anthracycline, such as adriamycin, is pre-

vented when N-acetyl-cysteine is orally administerd about one hour prior to the treatment with the antracycline.

PAT-APPL-6-139 236 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Hepatitis B Immune Globulin Used to Inactivate Hepatitis B Virus in Injectable Biological Products.
Patent Application,
David J. Aronson, Edward Tabor, and Robert J. Gerety. Filed 11 Apr 80, 8p PB80-208739
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The utilization of hepatitis B immune globulin as a preparation for preventing transmission of the hepatitis B virus (HBV) by injectable biologics, by incubation of the injectable biologics and hepatitis B immune globulin together in vitro prior to administration to patient. The hepatitis B immune globulin is utilized in a dosage of 5 ml and in a preferred titer of 1 to 100,000. The titer may vary to a range of 1 to 100 concentration with an intermediate range of 1 to 1,000; ranging down to 1 to 100,000. Also there may be used other immune globulins such as immune serum globulin (ISG).

PATENT-4 203 971 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Neisseria Gonorrhoeae Vaccine.
Patent,
Thomas M. Buchanan. Filed 23 Mar 78, patented 20 May 80, 4p PB80-210966, PAT-APPL-889 343 Supersedes PB-291 358.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is a vaccine affording protection against infection by Neisseria gonorrhoeae (N.g.) microorganisms is prepared from principal outer protein material isolated from gonococci.

PB80-199128 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC.
Safe Environments -Anthropometric, Biomechanical, and Activity Considerations.
Final rept.,
Clarke E. Jones, and John V. Fechter. Sep 79, 154p NBSIR-80-2014
Report on HEW/NBS Fire/Life Safety Program.

This report has been prepared for the National Bureau of Standards' Center for Fire Research as part of their support to the Office of Human Development Services of the U.S. Department of Health, Education and Welfare. The major objective of this report is to summarize data describing the physical characteristics of 'normal' and disabled people as actual or potential resident's of 'normal' homes, the space through which they move, their limits of bodily action, the causes of their injuries, and the factors influencing their use of residential time. The data have been obtained almost entirely from published literature. Specific and general evaluations of the applicability of the data to normal home activities are presented.

PB80-201429 PC **A14**/MF **A01**
National Cancer Inst., Bethesda, MD.
Proceedings of the National Cancer Communications Conference (4th), Held at Chicago, Illinois June 1977.
Jun 77, 310p DHEW-PUB-78-1463
Sponsored in part by American Cancer Society, Inc., New York.

These are the proceedings of the fourth in a series of meetings designed to provide information exchange among the National Cancer Institute, the American Cancer Society, and other organizatons concerned with cancer. The primary purpose of this meeting is to increase cancer knowledge among cancer communicators, to educate cancer communicators about the activities of cancer organizations other than their own, and to facilitate the coordinated undertaking of joint projects at both the local and national levels. The proceedings include speeches and panel discussions made by 47 communicators over a 2 day period on the following topics; the Combined Modality Approach of Women with Primary Breast Cancer; reconstruction of the breast; social and psychological problems of mastectomy patients; public information; Cancer Quackery; North Carolina Thyroid Alert Program; childhood cancer; Stop Smoking plans and clinics; colo-rectal cancer Community Outreach; head and neck cancer; counseling and rehabiliation; Cansurmount; Blood Program; pretesting; Cancer Information Clearinghouse; minorities and special audiences; public information through telephone services; cancer information in the media; food-related carcinogenesis and the FDA; and environmental causes of cancer.

PB80-201569 PC **A04**/MF **A01**
Institute of Medicine, Washington, DC.
U.S. Participation in Clinical Research in Developing Countries: Report of a Study.
Final rept.
Apr 80, 55p IOM-80-04
Contract ST8A80

The United States, through its support of bilateral and multilateral foreign assistance programs, has been committed for many years to helping developing countries in their efforts toward economic and social advancement. Because the health needs of developing countries are so great and so immediate, U.S. assistance has been primarily directed to the application of existing knowledge. Substantial aid has been employed in vector control, sanitation, provision of safe water supplies, and delivery of health care. Some of the major health problems, however, are unlikely to be resolved with existing medical technologies, and obviously require more research. The level of U.S. effort devoted to clinical research on the major diseases of the developing countries has been modest.

PB80-202260 PC **A03**/MF **A01**
Cedars-Sinai Medical Center, Los Angeles, CA.
National Cooperative Gallstone Study. Volume 6. Recurrence Study Protocol (Phase III).
27 Jun 78, 45p NIH-N01-AM-3-2216-174
Contract N01-AM-3-2216
See also PB-246 569 and PB-278 829.

This presents the protocol used in the Recurrence Study (Phase III) of the National Cooperative Gallstone Study. The aim of this double-blind, randomized control trial is to determine the following factors in patients from the Phase II trial in whom cholesterol gallstones were dissolved by oral chenodeoxycholic acid treatment: (1) the incidence and rapidity of gallstone recurrence, (2) whether a low dose (375 mg/day) chenodeoxycholic acid can maintain cholesterol desaturated bile and prevent the recurrence of gallstones, and (3) the correlation between return of cholesterol saturated bile and recurrence of gallstones. The study period is a minimum of two years following gallstone dissolution but may extend to 5 years in some cases because it is a common close-out date study. There are two groups of patients, placebo and chenodeoxycholic acid (375 mg/day).

PB80-203953 CP **T07**
National Center for Health Statistics, Hyattsville, MD.
National Health Interview Survey, 1977.
Data file,
Robert R. Fuchsberg, Ethel R. Black, and Nelma B. Keen. 1977, mag tape NCHS/DF-80/028
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB-262 954, PB-281 130, PB80-203961, PB80-203979, PB80-203987, PB80-203995, and PB80-204001.

The National Health Interview Survey (NHIS) utilizes a questionnaire which obtains information on personal and demographic characteristics, illness, injuries, impairments, chronic conditions, and other selected health characteristics. It is based on a continuing nationwide sample of households of the civilian noninstitutionalized population of the United States living at the time of the interview. The medical data are based on the International Classification of Diseases, Adapted (ICDA). In 1977, data were collected during the entire 52 weeks. The sample consisted of approximately 40,000 households containing about 111,000 persons.

PB80-203961 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Health Interview Survey, 1977. Estimate and Sampling Variance.
Vital and health statistics series.
Jun 80, 37p VHS/SER-2/38, DHEW/PUB/HRA-74-1288, NCHS/DF-80/028A
For data file on magnetic tape, see PB80-203953.
Library of Congress catalog card no. 76-605819.

This report presents a method for computing variances of estimates derived from the Health Interview Survey (HIS). In addition it gives a brief description of the HIS sample design, a detailed account of how the estimator for health statistics is constructed, and an iterative method for fitting a curve to a set of variance estimates to obtain approximations that can be used for serveral different types of estimates derived from survey data. The variance estimator is a adaptation of one initially developed by Professor Nathan Keyfitz. In applying the method to the Health Interview Survey, difficulties arise because certain fundamental assumptions are not met. The report tells how these problems were resolved, develops the theory which applies to the complex HIS estimator and discusses some aspects for programming the procedure for the computer.

PB80-203979 PC **A12**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Health Interview Survey, 1977: Interviewer's Manual.
Jun 80, 274p HIS-100-77, NCHS/DF-80/028B
For system on magnetic tape, see PB80-203953.
See also report for 1975, PB-281 131. Prepared in cooperation with Bureau of the Census, Washington, DC.

The National Health Interview Survey (NHIS) utilizes a questionnaire which obtains information on personal and demographic characteristics, illness, injuries, impairments, chronic conditions, and other selected health characteristics. It is based on a continuing nationwide sample of households of the civilian noninstitutionalized population of the United States living at the time of the interview. The medical data are based on the International Classification of Diseases, Adapted (ICDA). In 1977, data were collected during the entire 52 weeks. The sample consisted of approximately 41,000 households containing about 111,000 persons.

PB80-203987 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Health Interview Survey, 1977. Diagnostic Recodes.
Jun 80, 44p NCHS/DF-80/028C
For data file on magnetic tape, see PB80-203953.

The National Health Interview Survey (NHIS) utilizes a questionnaire which obtains information on personal and demographic characteristics, illness, injuries, impairments, chronic conditions, and other selected health characteristics. It is based on a continuing nationwide sample of households of the civilian noninstitutionalized population of the United States living at the time of the interview. The medical data are based on the International Classification of Diseases, Adapted (ICDA). In 1977, data were collected during the entire 52 weeks. The sample consisted of approximately 41,000 households containing about 111,000 persons. Recode No. 1 is a list of 278 categories of diseases and injuries. In addition, a complete list of types and sites of impairments of the Classifications of Impairments (X-Code) completes the recode.

PB80-203995 PC **A06**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Health Interview Survey, 1977. Current Estimates.
Vital and health statistics series.

Jun 80, 105p VHS/SER-10/126, DHEW/PUB/PHS-78-1554
For data file on magnetic tape, see PB80-203953. See also report for 1976, PB-300 424. Library of Congress catalog card no. 65-62623.

The National Health Interview Survey (NHIS) utilizes a questionnaire which obtains information on personal and demographic characteristics, illness, injuries, impairments, chronic conditions, and other selected health characteristics. It is based on a continuing nationwide sample of households of the civilian noninstitutionalized population of the United States living at the time of the interview. The medical data are based on the International Classification of Diseases, Adapted (ICDA). In 1977, data were collected during the entire 52 weeks. The sample consisted of approximately 41,000 households containing about 111,000 persons.

PB80-204001 PC **A07**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Health Interview Survey, 1977. Formats for Public Use Tapes.
Jun 80, 142p NCHS/DF-80/028E
For system on magnetic tape, see PB80-203953.

The National Health Interview Survey (NHIS) utilizes a questionnaire which obtains information on personal and demographic characteristics, illness, injuries, impairments, chronic conditions, and other selected health characteristics. It is based on a continuing nationwide sample of households of the civilian noninstitutionalized population of the United States living at the time of the interview. The medical data are based on the International Classification of Diseases, Adapted (ICDA). In 1977, data were collected during the entire 52 weeks. The sample consisted of approximately 41,000 households containing about 111,000 persons.

PB80-204092 Mag Tape $125.00
National Center for Health Statistics, Hyattsville, MD.
National Ambulatory Medical Care Survey, 1978.
Data file,
James E. DeLozier, Raymond O. Gagnon, and Malcolm C. Graham. 1978, mag tape NCHS/DF-80/029
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-204100.

The National Ambulatory Medical Care Survey (NAMCS) provides data on ambulatory medical care rendered in physicians' offices. The NAMCS is a continuous survey based on a sample of patient visits to a national sample of office-based physicians. The survey obtains information of the volume of office visits by age, race, and sex of the patient and by selected physician characteristics such as type of specialty and practice and geographic location. Data describing the clinical substance of these visits include the patient's problem or complaint, prior visit status, referral status, time since onset of complaint, seriousness of the problem, physician's diagnosis, diagnostic and therapeutic services provided, disposition, and duration of the visit. The patient's problem or complant is coded according to a revised symptom classification developed specifically for the NAMCS. The physician's diagnosis is coded according to the 'Eighth Revision of the International Classification of Diseases Adapted for Use in the United States (ICDA)'. In 1978 NAMCS sampled about 47,000 patient records from the 1,850 doctors who participated in the survey.

PB80-204100 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Ambulatory Medical Care Survey, 1978. Microdata Tape Documentation.
James E. DeLozier. Jun 80, 54p NCHS/DF-80/029A
For system on magnetic tape, see PB80-204092.

The National Ambulatory Medical Care Survey (NAMCS) provides data on ambulatory medical care rendered in physicians' offices. The NAMCS is a continuous survey based on a sample of patient visits to a national sample of office-based physicians. The survey obtains information on the volume of office visits by age, race, and sex of the patient and by selected physician characteristics such as type of specialty and practice and geographic location. Data describing the clinical substance of these visits include the patient's problem or complaint, prior visit status, referral status, time since onset of complaint, seriousness of the problem, status, referral status, time since onset of complaint, seriousness of the problem, physician's diagnosis, diagnostic and therapeutic services provided, disposition, and duration of the visit. The patient's problem or complaint is coded according to a revised symptom classification developed specifically for the NAMCS. The physician's diagnosis is coded according to the 'Eighth Revision of the International Classification of Diseases Adapted for Use in the United States (ICDA)'. In 1978 NAMCS sampled about 47,000 patient records from the 1,850 doctors who participated in the survey.

PB80-206246 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
DRAM: A Model of Health Care Resource Allocation.
Final rept.,
David Hughes, and Andrzej Wierzbicki. cMay 80, 68p RR-80-23

This is the second research report on the disaggregated resource allocation sub-model called DRAM. It describes the extension of the Mark 1 version (RR-78-8) to include the distribution of many resources across different modes of care. The earlier assumption that all available resources must be used has been relaxed, and an extensive analytic treatment suggests various methods for estimating the submodel's parameters. Several case studies that use the model are in progress and reports on these applications will be forthcoming. (Copyright (c) 1980, International Institute for Applied Systems Analysis.)

PB80-207319 PC **A09**/MF **A01**
Philadelphia Health Management Corp., PA.
An Assessment of the Utility of Federally Required Program Evaluation in Community Mental Health Centers. Volume II.
Final rept.,
Eugenie W. Flaherty, and Kristin Olsen. Dec 78, 192p NIMH-77-7-2
Contract PHS-HSM-278-77-0067
See also Volume 1, PB80-207327.

Contents:
- Recommendations for citizen review and involvement in evaluation;
- Recommendations for changes in federal evaluation requirements;
- Recommendations for quality assurance;
- Technical assistance;
- Conclusions and policy recommendations.

PB80-207327 PC **A08**/MF **A01**
Philadelphia Health Management Corp., PA.
An Assessment of the Utility of Federally Required Program Evaluation in Community Mental Health Centers. Volume I.
Final rept.,
Eugenie W. Flaherty, and Kristin Olsen. Dec 78, 152p NIMH-77-7-1
Contract PHS-HSM-278-77-0067
See also Volume 2, PB80-207319.

The CMHC Amendments of 1975 (PL 94-63) made explicit requirements for all CMHCs to carry out program evaluation studies, and specified the kinds of program evaluation activities to be done. These requirements constituted a real change in the philosophy of management of mental health program because the new legislation required CMHC managers to plan and make decisions based upon systematically collected data and the effects of services upon clients, and also to report such information annually. Development of program evaluation to produce data-based decision-making requires a wide range of specialized skills which many CMHCs in the past have not had readily available to them. This study assesses the implications of PL 94-63 for CMHC evaluation activities: the usefulness of Regional Office and NIMH assistance to CMHC evaluation; and develops recommendations for Federal support of program evaluation. This study consists of two phases, Phase I and II, of which only Phase I is described in this final report. Phase I of the study describes results of interviews conducted at nine CMHCs, selected randomly from strata of metropolitan, nonmetropolitan and large and small centers, with six persons at each center--the director; the fiscal member; a program evaluator; a clinician; a community board member; and a citizen. The interviews focused on the usefulness of Federal requirements for self-evaluation, quality assurance, citizen review, and the value of Federal technical assistance. A large number of recommendations are presented.

PB80-929411 PC**$5.25**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Neoplasms of the Pediatric Age Group.
Special listing.
7 Jul 80, 57p NCI/ICRDB/SL-339
Supersedes NTISUB/E/294-015.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Epidemiology and etiology of pediatric neoplasms, and related experimental studies; Epidemiology, etiology, and natural history of specific childhood neoplasms, and related experimental studies; Diagnosis and therapy of pediatric neoplasms; Other studies related to pediatric neoplasms.

PB80-929904 PC**$4.50**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Animal, Tissue, Chemical and Viral Supply Sources for Cancer Research.
Special listing.
8 Jul 80, 29p NCI/ICRDB/SL-343
Supersedes NTISUB/E/299-003.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Sources for tissue and serum samples, and centers for cell and organ cultures; Source facilities for animals; Other research resources and services.

PB80-929906 PC**$5.25**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Development and Application of in vitro Techniques.
Special listing.
15 Jul 80, 52p NCI/ICRDB/SL-340
Supersedes NTISUB/E/299-006.

The SPECIAL LISTING of Current Cancer Research Projects is a publication of the INTERNATIONAL CANCER RESEARCH DATA BANK (ICRDB) Program of the National Cancer Institute. Each LISTING contains descriptions of ongoing projects in one selected cancer research area. Approximately 50 different cancer research areas are covered by a separate SPECIAL LISTING. The research areas include: somatic cell hybridization studies; Establishment, optimization, and characterization of cell cultures; Specific applications of tissue culture techniques in cancer research.

RERF-TR-3-77 PC **A02**/MF **A01**
Radiation Effects Research Foundation, Nagasaki (Japan). Nagasaki Branch.
Foreign Bodies Radiographically Demonstrated in Atomic Bomb Survivors.
S. Tamura, H. Onitsuka, K. K. Lee, Y. Shimizu, and W. J. Russell. Feb 78, 15p
Contract EX-76-C-28-3161
In Japanese and English.

The prevalence of roentgenologically-detected foregin bodies among atomic bomb survivors was

studied as an indicator of the A-bomb blast effects. Acupuncture was studied as an indicator of possible A-bomb-related abnormalities for which it was administered. All available roentgenograms of Adult Health Study (AHS) subjects which demonstrated foreign bodies were reviewed. The frequency of glass and metal foreign bodies and of acupuncture needles was analyzed in detail. Analyses were made by distance from the hypocenter, sex, age, body sites involved, and shielding at the time of the A-bomb (ATB). The presence of glass fragments correlated closely with distance from the hypocenter, with heavy shielding from the A-bombs, and with adulthood, and they were more frequent in the chest than in the hand and wrist. On the contrary, metal foreign bodies were more frequent in the hand and wrist than in the chest, and were not associated with distance from hypocenter or heavy shielding. The prevalence of acupuncture needles increased with age, but did not correlate with A-bomb dose. (ERA citation 04:052201)

SAAS-232 PC **A02**/MF **A01**
Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German D.R.).
Use of Cholesteric Liquid Crystal Thermography for Diagnosing Radiation Injuries of Human Skin.
U. Lenz, and P. Schmidt. 1978, 16p
In German.
U.S. Sales Only.

In examining radiation injuries of human skin, measurements of skin temperature have been performed using cholesteric liquid crystals. Following a detailed description of the thermographic procedure, the feasibility of use and the potential significance of the method for judging the extent of skin damage have been discussed on the basis of practical results so far obtained. (Atomindex citation 09:417608)

SAND-79-1536 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Environment, Safety, and Health Assurance Program Standard: Analysis in the Context of Department of Energy Environment, Safety, and Health Requirements.
A. C. Ellingson, and C. A. Trauth, Jr. Sep 79, 45p
Contract EY-76-C-04-0789

An Environment, Safety and Health (ES and H) Assurance Program Standard is presented. The Standard was published for comments in a previous document, and has been revised as a result of those comments. The benefits of using the Standard are described and, through the use of comparisons, it is demonstrated that the requirements of the applicable Department of Energy (DOE) Orders are satisfied by a program designed in accordance with the Standard. (ERA citation 05:003603)

SRD-R-125 PC **A03**/MF **A01**
UKAEA Safety and Reliability Directorate, Culcheth (England).
Individual Risk. A Compilation of Recent British Data.
D. R. Grist. Aug 78, 26p
U.S. Sales Only.

A compilation of data is presented on individual risk obtained from recent British population and mortality statistics. Risk data presented include: risk of death, as a function of age, due to several important natural causes and due to accidents and violence; risk of death as a function of location of accident; and risk of death from various accidental causes. (Atomindex citation 10:437231)

6F. Environmental Biology

AD-A086 526/1 PC **A10**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Guidelines for Terrestrial Ecosystem Survey.
Final rept.,
William D. Severinghaus. May 80, 218p Rept no. CERL-TR-N-89

This report provides guidelines that will enable Army installations to compile and maintain enough information on flora and fauna to produce satisfactory environmental impact assessments and statements. The report outlines a three-stage method for data acquisition and contains appendices listing literature resources and specialists. By completing Stage I, users create a series of maps, overlays, and tables that give an estimate of the amount of habitat, types of vegetation, and types of animals existing on the installation. Stage II involves a field verification of the information from Stage I. Stage III requires the explicit documentation of population densities and other ecological parameters of the various organisms on the installation. (Author)

AD-A086 663/2 PC **A02**/MF **A01**
Clapp (William F) Labs Inc Duxbury MA
The Activity of Limnoria tripunctata in Piling Cut-Offs from Naphthalene-Enriched Creosoted Pilings.
Progress rept.,
C. I. Belmore. 5 Jun 80, 12p Rept no. 14985
Contract N00014-79-C-0667

The objectives of this study were to determine the preservative effectiveness of various percentages of naphthalene-enriched creosote treatments exposed to Limnoria tripunctata attack in the laboratory and in a natural seawater environment; to determine if Limnoria attack is accelerated by exposure in the laboratory and to investigate if there are any seasonal differences in the rate of Limnoria attack in a natural environment where molluscan borers are also present. A total of 38 discs, nine treated with 10% naphthalene creosote, 10 with 28% naphthalene creosote, 10 with 30% naphthalene creosote, and nine with 40% naphthalene creosote were used. The 20% naphthalene creosote wedges showed the most resistance to Limnoria tripunctata attack in the laboratory exposures. In field exposures, all discs were heavily fouled. The dominant fouling organisms were barnacles, mainly Balanus eburneus with lesser amounts of Balanus amphitrite. Traces of hydroid (Tubularia), a few polychaetes (Nereis), and amphipods were also observed. The fouling was scraped off and the discs inspected for the presence of Limnoria tunnels and other marine borers. The discs were then resubmerged. No evidence of any other borers except Limnoria was observed on the discs. Traces of Limnoria attack were found in the field exposures in one of the 20% and one of the 40% naphthalene creosote treated discs.

AECL-6084 PC **A04**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Cancers and Genetic Defects Resulting from the Use of Various Energy Sources.
D. K. Myers. Jun 78, 66p
U.S. Sales Only.

A review of recent literature on carcinogenic effects of chemical products derived from the combustion of organic fuels suggests that the numbers of fatal cancers and genetic defects induced by utilization of fossil fuels may be much greater than the numbers induced by utilization of nuclear power to produce the same amount of energy. Despite the uncertainties involved in these estimates, the maximum risk of fatal cancers due to carcinogenic by-products associated with the production of electricity by any of these methods appears to be remarkably low compared with the risk of other fatal hazards in Canada and the U.S.A. (Atomindex citation 10:426589)

AED-Conf-77-473-017 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Radiological Impact on the Population Living around the Karlsruhe Reprocessing Plant - the GAP Between Conservative and Realistic Estimates.
W. G. Huebschmann, and D. Papadopoulos.
1977, 10p CONF-771139-14
In German.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

To evaluate the radiological impact on the population the discharges and the meteorological parameters are measured. Based on these measurements and on the models describing the distribution, the corresponding doses at given locations in the environment are estimated. This is a 'conservative' calculation, which means that the doses are overestimated. Using the WAK as an example the discrepancy of conservative and realistic dose estimates is shown. The period of operation considered is from 1972 through 1976. The following reasons contribute to the descrepancy between conservative and realistic dose estimates: 1) Less activity is emitted than was applied for. 2) The plume rise by momentum and buoyancy is neglected. 3) The maximum local dose is determined irrespective of whether people live permanently at the location thus designated or the area is put to agricultural use. 4) In case of external beta -irradiation shielding by clothing is neglected. 5) When calculating the doses received by inhalation of aerosols and T, adsorption and absorption by vegetation is neglected. 6) For the pasture-cow-milk-pathway an ingestion dose factor is prescribed; this inhibits the application of realistic factors. 7) When calculating dose equivalent values for ingestion - e.g. Sr - through the consumption of vegetables and other plants, conservative factors are used which imply a considerable overestimate of ingestion doses. 8) The addition of ingestion, inhalation and external doses, each calculated for the location of the dose maximum, leads to a further overestimate. The combination of these various effects demonstrates that in some cases a large discrepancy exists between dose equivalent results as obtained from conservative or realistic estimates. This discrepancy increases with the number of factors to be considered in calculating the doses for a given exposure pathway. It is maximal for ingestion doses. (Atomindex citation 09:386282)

AED-Conf-77-473-018 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Impact of Release of Cesium-134 and -137 from Windscale on the Marine Environment.
A. Preston, N. T. Mitchell, and D. F. Jefferies.
1977, 11p CONF-771139-15
Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

One of the most important components of the liquid effluent released from the BNFL fuel reprocesssing plant at Windscale to the Irish Sea in recent years has been Cs exp 137 . Together with exp 134 Cs it has been responsible for the highest levels of radiation exposure to the public. Cs is essentially conserved in solution in the marine environment and disperses through waters of the Irish Sea and beyond which include important fisheries. Though Cs is found in a number of materials including edible seaweed and sediment, both components of exposure pathways to the human population, it is through consumption of fish and shellfish that it generates the highest doses. The paper includes a brief review of other marine environmental exposure pathways but concentrations on recent environmental measurements of exp 137 Cs and exp 134 Cs and discusses in detail how estimates of dose via the consumption of fish and shellfish have been derived. Dose to individual (critical group) members of the public represents a higher proportion of the ICRP-recommended dose limit than does the collective or average, per caput, dose when related to the appropriate limit. It is thus on the former criterion that environmental capacities are assessed whilst the role of the latter is found in decision-making such as in application of the principle of keeping doses as far as below the dose limits as is reasonably achievable. (Atomindex citation 09:386299)

AED-Conf-77-473-030 PC **A03**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Cost-Benefit Considerations of Reducing Environmental Exposures and Effluents from Uranium Fuel Cycle Facilities to Levels Below Limits Set by the U.S. Environmental Protection Agency.
R. M. Bernero, D. F. Harmon, and K. G. Steyer.
1977, 29p CONF-771139-11
Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.

U.S. Sales Only.

Cost-benefit analyses have been made for further reducing effluent releases and environmental exposures from uranium fuel cycle facilities below the limits established by the EPA. The primary purpose for the analyses is to examine whether the effluent releases and environmental exposures from fuel cycle facilities in the US conforming to EPA standards can be considered to be 'as-low-as-reasonably-achievable' as required by regulations established by the NRC. The analyses are based on studies performed by the ORNL under contract with NRC. The analyses indicate that it would cost significantly in excess of 1000 per organ-person-rem to further reduce environmental exposures and effluent releases below the EPA standards from uranium mills, uranium oxide fuel fabrication plants, and uranium fuel reprocessing facilities. Although 1000 per organ-person-rem is an interim guideline value set for consideration of effluents, its use here indicates that NRC may consider that releases from fuel cycle facilities will be as-low-as-reasonably-achievable if they meet the EPA limits. (Atomindex citation 09:386268)

CENA-BC-046 PC **A02**/MF **A01**
Centro de Energia Nuclear na Agricultura, Piracicaba (Brazil).
Technique for Ecological Studies of the Cuban Fly, 'Lixophaga Diatraea' TOWNS., Using Radioactive Tracers.
R. B. Sgrillo, F. M Wiendl, J. M. M Walder, and V. Arthur. 27 Apr 77, 17p
In Portuguese.
U.S. Sales Only.

The specific activity of exp 32 P required to label Cuban Fly (lixophaga diatraca) is determined. Results show that the radioisotope can be detected inside the bodies of G. mellonella host for at least 6 days, with effective half-life for the raioisotope of 2.8 days. (Atomindex citation 09:417734)

CONF-800543-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Population-Level Assessments Should Be Emphasized over Community/Ecosystem-Level Assessments. Environmental Sciences Division Publication No. 1535.
W. Van Winkle. 1980, 12p
Contract W-7405-ENG-26
National workshop on entrainment and impingement, San Francisco, CA, USA, 5 May 1980.

Arguments are presented in favor of emphasizing population-level assessments over community/ecosystem-level assessments. The two approaches are compared on each of four issues: (1) the nature of entrainment/impingement impacts; (2) the ability to forecast reliably for a single fish population as contrasted to the ability to forecast for an aquatic community or ecosystem; (3) practical considerations involving money, manpower, time, and the need to make decisions; and (4) the nature of societal and economic concerns. The conclusion on each of these four issues is that population-level assessments provide the optimal approach for evaluating the effects of entrainment and impingement mortality. (ERA citation 05:024025)

CONF-800543-4 MF **A01**
Oak Ridge National Lab., TN.
Impact of Impingement on the Hudson River White Perch Population.
L. W. Barnthouse, and W. Van Winkle. 1980, 19p
Contract W-7405-ENG-26
National workshop on entrainment and impingement, San Francisco, CA, USA, 5 May 1980, Portions of document are illegible.
Microfiche copies only.

The impact of power plant impingement on the 1974 and 1975 year classes of the Hudson River white perch population is assessed using a simple model derived from Ricker's theory of fisheries dynamics. The impact of impingement is expressed in the model as the conditional mortality rate, rather than as the more commonly used exploitation rate. Since the calculated impact is sensitive to errors in the estimation of population size and total mortality, ranges of probable values of these quantities are used to compute upper and lower bounds on the fractional reduction in abundance of each year class. Best estimates of abundance and mortality are used to compute the conditional impingement mortality rate separately for each plant and month. The results are used to assess the relative impacts of white perch impingement at six Hudson River power plants and to identify the seasons during which the impact is highest. (ERA citation 05:024026)

IAEA-R-1008-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Use of Labelled Pesticides for Studying Problems of Effectiveness of Tsetse Fly Control Programmes and for Studying Problems of Environmental Contamination. Part of a Coordinated Programme on Tracer-Aided Studies of Foreign Chemical Residues in the Agricultural Environment. Final Report for the Period 1 April 1971--30 June 1976.
J. Sserunjoji Ssebalija. Feb 77, 1p
U.S. Sales Only.

No abstract available.

IAEA-R-1444-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Developing Methods of Measuring Competitiveness of Sterilized Laboratory Insects. Part of a Coordinated Programme on the Use of the Sterile Male Technique for Control of Lepidopterous Insects Attacking Fruit and Forest Trees. Final Report for the Period 10 December 1973--14 April 1978.
L. Szalay-Marzso. Aug 78, 21p
U.S. Sales Only.

Optical and acoustical equipment were developed and tested for measuring insect activity, one of the parameters used to assess insect quality. The acoustical equipment which recorded the sound generated by moving insects performed well in the laboratory but was either unsuitable to measure the activity of populations as opposed to pairs or was unsuitable under field conditions. The optical equipment, however, based on light interception, performed well in the field also. In other studies the fitness of insects receiving various treatments was assessed on the basis of release-recapture experiments, number of matings and percentage sperm transfer. These methods proved very sensitive but were more laborious compared to automated recordings. (Atomindex citation 10:437203)

IAEA-R-516-F MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Investigations on the Use of the Sterile Male Technique for the Control of Codling Moth in an Integrated Pest Control System. Final Report for the Period 1 October 1977--14 July 1978.
K. Russ. Oct 78, 50p
U.S. Sales Only. Microfiche copies only.

The diapause of the codling moth, Laspeyresia pomonella L., was studied in relation to various altitudes of origin. Altitudes of 350 m and 1300 m above sea level showed that low-altitude moths had a longer diapause. Altitude appears to affect the duration of larval diapause. Biological control by virus-induced granulosis was investigated, using 3 to 4 applications of the virus per tree per season, at the rate of 2x10 exp 11 to 9x10 exp 11 virus capsules per application. Codling moth infestation was reduced by 74.2% to 88.2%. Trichomma enecator and Ascogaster quadridentatus Wesm., both parasites of the codling moth, were both colonized in the laboratory, and population dynamics are being studied. Copulatory behaviour in the males of A. quadridentatus is elicited primarily by pheromones produced by the female. Males emit some sounds which appear primarily intended to convey territorial rights to other males. The frequencies produced by males and by females differ. Codling moth odours stimulate females to oviposit. The effect of pesticides on parasitation is being studied. Details of a planned mass-rearing facility for lepidopteran and other pests are given. (Atomindex citation 10:437199)

NUREG/CR-1209 PC **A04**/MF **A01**
Lehigh Univ., Stone Harbor, NJ. Wetlands Inst.
Analysis of Populations of Boring and Fouling Organisms in the Vicinity of the Oyster Creek Nuclear Generating Station.
Quarterly progress rept. no. 12, Jun-Aug 79,
K. E. Hoagland, and L. Crocket. Jul 80, 60p
See also report for Mar-May 79, NUREG/CR-1015.

The growth, distribution, and species composition of marine borers (primarily shipworms) and fouling organisms are being studied in the vicinity of the Oyster Creek Nuclear Generating Station, Barnegat Bay, New Jersey. Untreated wood test panels are used to collect organisms at 18 localities. Our most recent findings covering June-August, 1979, are that at least one subtropical species of the borer family Teredinidae, Teredo bartschi, continues to live in Oyster Creek and can breed in Forked River, although many die off in winter in Forked River and the species may have to recolonize. A few of the subtropical T. furcifera also survive in Oyster Creek but cause negligible damage at present, compared with T. bartschi. The summer, 1979, outbreak of T. bartschi in Oyster Creek was severe, causing nearly total destruction to wood panels. The breeding season for T. bartschi was the same as in 1978. Some fouling organisms were present in Oyster Creek that are absent in control creek stations due to low salinity.

N80-27836/9 PC **A07**/MF **A01**
University of Central Florida, Orlando. Dept. of Biological Sciences.
A Continuation of Base-Line Studies for Environmentally Monitoring Space Transportation Systems at John F. Kennedy Space Center. Executive Summary.
Report, Jun. 1976 - Mar. 1979.
I. J. Stout. Jul 80, 133p NASA-CR-163122, KSC-TR-51-2
Contract NAS10-8986

Studies conducted in and around John F. Kennedy Space Center, Merrit Island, Florida were designed to establish baseline conditions for various attributes of the biotic and abiotic environment. Features were described and quantitatively measured. Certain condition were found to be appropriate for the detection and assessment of possible environmental perturbations caused by future NASA activities. These include plant communities, mammal populations, rainfall chemistry, fish populations, and the status of rare and endangered species. On the basis of statistical analysis of quantitative data and logistic considerations, it was possible to refine the kinds and amounts of measurements needed to evaluate perturbations in selected environmental components.

PB80-200967 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Center for Environmental Quality.
The Harmoniously Confused World, A Report About Six Years of Research on the Ecosystems Design and Management Program,
Charles R. Downs. 1979, 43p NSF/RA-761244
Grant NSF-ARA-7001077

Establishment of a new science of ecosystem design and management at Michigan State University (MSU) is described. The interdisciplinary approach to ecological problems represented a reaction against mathematical models for ecological systems developed by engineers in the early 1960's. MSU's Ecosystem Design and Management Program (EDMP) underwent three phases from 1970-76. The first phase provided continuation and expansion of planning that led to the initial NSF grant. Investigators explored current developments in a wide array of disciplines and determined ways in which collaborative efforts might have maximum impact on environmental quality. The second phase encompassed five subprojects: (1) pest management, (2) beef production, (3) stream ecosystems, (4) lake ecosystems, and (5) soil ecosystems.

PB80-202344 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
Leeches (Annelida: Hirudinea) Found in North American Mollusks.
Journal article,
Donald J. Klemm. 1976, 16p EPA-600/J-76-104
Pub. in Jnl. of Malacological Review, v9 p63-76 1976. Prepared in cooperation with Michigan Univ., Ann Arbor. Museum of Zoology.

Aquatic leeches are important as parasites and predators of many groups of animals. Eleven species are reported living in North American snails and clams, 7 of which are known to behave as parasites, 2 are assumed to be parasitic, and the other 2 are not parasitic. In this paper these leeches are listed, a key is provided to the species, their known molluscan hosts are indicated, and aspects of their taxonomy are dicussed.

PB80-203698 PC **A12**/MF **A01**
Urban Wildlife Research Center, Inc., Ellicott City, MD.
An Annotated Bibliography on Planning and Management for Urban-Suburban Wildlife.
Daniel L. Leedy. Dec 79, 262p FWS/OBS-79/25
Sponsored in part by Wildlife Management Inst., Washington, DC., and Missouri Dept. of Conservation, Jefferson City. See also report dated Jan 78, PB-280 172.

An annotated bibliography of literature sources pertaining to management of and planning for wildlife in urban and suburban settings is presented. Emphasis is placed on the positive value of wildlife in such settings, and consideration extends beyond traditional associations (e.g., rodents, feral canids and felines). Of particular interest is the role of urban planners and developers in maintaining diverse natural environments beneficial to both man and animal. References are classified by major subject headings including management and planning aspects, effects of urbanization on wildlife, values of wildlife and research and education. Abstracts are given for each citation.

PB80-204902 PC **A03**/MF **A01**
Academy of Natural Sciences of Philadelphia, PA. Div. of Limnology and Ecology.
Screen Impingement and Potential Auxiliary Pump Entrainment.
Final rept.,
J. Howard Hixson, III. 5 Jun 80, 31p 80-7F, PPSP-CP-80-5

The potential for fish entrainment at the auxiliary pump intake at the Chalk Point Power Station was assessed and compared to impingement potential. For fish which were sampled effectively, rates were comparable.

PB80-208598 PC **A04**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Chesapeake Bay Inst.
Prediction of Biological Impacts Associated with Expansion of Vienna Steam Electric Station,
Robert G. Otto, Marie Van Deusen, and Leslie S. Kaufman. Apr 80, 65p PPSP/JHU/PPSE-8-11

This report contains an environmental assessment of the possible biological effects of the proposed expansion of the Vienna steam electric station. Topics addressed include construction impacts (Aquatic and terrestrial), operational impacts (Water intake effects and discharge effects), raw materials transport and storage, combustion waste-related impacts, salt deposition, and human health effects.

PB80-209539 PC **A18**/MF **A01**
State Univ. System of Florida Inst. of Oceanography, St. Petersburg.
Proceedings of Marine Environmental Implications of Offshore Drilling in the Eastern Gulf of Mexico. Conference/Workshops Held at St. Petersburg, Florida on January 31, February 1, 2, 1974.
Final rept.
Mar 74, 423p BLM/YM/ES-74/4
Contract DI-08550-CT4-5
Sponsored in part by Environmental Protection Agency, Washington, DC., and American Petroleum Inst., Washington, DC.

The impending Outer Continental Shelf (OCS) oil exploration and production activities in the eastern Gulf of Mexico have catalyzed the interest and concern of a significant cross section of individuals and organizations. The conference/workshops were planned and held to properly define by priority the critical research and/or information needs in the subject area, to discuss the development of a scientifically sound and relevant interdisciplinary program and to identify the persons to implement same. The conference/workshop sessions were attended by 352 persons; participants came from many parts of the United States.

SAAS-241 PC **A02**/MF **A01**
Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German D.R.).
Assessment of Dietary of exp 90 Sr and exp 137 Cs by the Population of the GDR.
H. Ziesak, M. Kunert, and J. Kunert. 1978, 12p
In German.
U.S. Sales Only.

Based on data pertaining to the per capita consumption of the most important classes of foodstuffs and their contents of exp 90 Sr and exp 137 Cs, calculations were made to find out the yearly ingestion of these fallout radionuclides by the adult population in 1975. The strong decline in values of ingestion to be noticed since 1964 is due to the falling exp 90 Sr and exp 137 Cs levels in most biomedia as well as to changes in nutritional habits and allows a sensible curtailment of the foodstuff monitoring programme for radionuclides to be made. (Atomindex citation 10:433248)

UCRL-Trans-11450 PC **A03**/MF **A01**
Causes of and Criteria for Immission Resistance in Spruce, Picea Abies (L.) Karst. IV. Recovery Power of the Needles, Relationships Between Forms of Resistance and Summary of Overall Results.
G. Braun. 1978, 35p
Contract W-7405-ENG-48
A, Eur. J. For. Pathol. 8 P83-96 1978.

Measurements of water potential in SO sub 2 treated Norway spruce showed that resistant clones recovered better than normal ones or at least showed less development of damage. Observation of needle discoloration gave only limited confirmation of this result. After fumigation, there was no relation of needle sulfur content and ability to recover. From a series of experiments on fumigation, it was concluded that reflexive and internal resistance were related. In a summary of the results of the series of four papers, the great importance of resistance to damaging materials is emphasized, and significant characteristics of resistant clones are indicated. There was also good evidence of a connection between pollution and drought resistance. (ERA citation 04:045457)

6H. Food

PB80-200215 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Data from 1977-78 Household Food Consumption Survey (Fall Quarter).
Data file,
Brucy C. Gray, and Mary Hama. 17 Jul 80, mag tape USDA/DF-80/009
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-190180.

The file contains food and nutrient data of 4072 households of which approximately 94 percent (3829) are housekeeping households for fall from the USDA 1977-78 Nationwide Food Consumption Survey collected during April 1977 through March 1978. Sample design provided for a national basic sample. When the weights are applied, the total fall weighted samples are 3729 interviews. The data were collected by personal interviews with household member most knowledgeable about the household food consumption. A food list was used to help recall kinds, quantities, (converted to pounds) and costs of foods used from the household food supply during the 7 days prior to the interview. Counts of meals eaten at home and away from home were recorded for each household member, as well as for guests' meals and/or snacks served from household supply. Money value of all foods per household is summarized. For each food item reported, there are its conversion factor and nutritive value for food energy, protein, fat, carbohydrate, calcium, iron, magnesium, phosphorus, vitamin A value, thiamin, riboflavin, niacin, vitamin B12, vitamin B6, and ascorbic acid. Other information includes household sizes in equivalent nutrition units, nutritive values per nutrition unit, ratios of nutritive value per nutrition unit to the Recommended Dietary Allowances, and weekly aggregate nutritive values. Household income, education and employment of household heads, and other factors that might affect food consumption were reported. Accompanied are the data file format information and code manual with food codes and descriptions of foods.

PB80-200223 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Food Intake of Individuals, Fall Basic, 1977-78.
Data file,
Brucy C. Gray, and Eleanor Pao. 17 Jul 80, mag tape USDA/DF-80/010
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density and parity. Call NTIS Computer Products for price. Price includes documentation, PB80-190226.

This file contains food and nutrient intake for 11,522 men, women, and children (weighted on household and age basis, 7,698 individuals, unweighted) collected in 48 conterminous states of U.S. in summer 1977, as part of Nationwide Food Consumption Survey 1977-78. The interview was conducted in the home with each eligible individual (half of the individuals over 18 years were systemically omitted) asked to recall his previous day's diet and then to keep a diet record for the next 2 days which the interviewer returned to review and pick up. Information was gathered on all days of the week including Saturday and Sunday. Data included names for each eating occasion, time, and person(s) sharing it, and if eaten away from home, where eaten, type of service, and cost. For each food and beverage, the kind and quantity (grams) are given and whether from home supplies or obtained away. Data given on vitamin and mineral supplements taken, frequency of consuming organ meats during previous 30 days, whether person is a vegetarian and if so, type of foods eaten, whether person is on a diet, whether diet was typical, and self-appraisal of health status. Characteristics available for each individual are sex, age, race, if Spanish descent; estimated height, weight; pregnancy and lactation status for women; household income before taxes (category): household size; and education, occupation, and employment status of male and female heads. Nutrient content of each food, each day's intake, and 2 or 3 a day average intakes are available for energy, protein, fat carbohydrate, calcium, iron, magnesium, phosphorus, vitamin A value, thiamin, riboflavin, preformed niacin and vitamins B6, B12, and C.

PB80-200884 PC **A07**/MF **A01**
Cornell Univ. Medical Coll., New York.
Controlled Microbial Conversion of Poultry Waste into a High Protein Feedstuff.
Final rept. 1 May 76-30 Oct 78,
Michael L. Shuler, Richard E. Austic, and Harry W. Seeley, Jr. 31 Jan 79, 146p NSF/RA-790438
Grant NSF-AER76-05681

This report describes technically feasible one- and two-stage processes for aerobic conversion of poultry manure into high protein feedstuff. These processes increase the efficiency of animal production and minimize the amount of waste matter released to the atmosphere. The two-stage continuous aerobic process begins with degradation of uric acid and release of ammonium ion and continues with the addition of carbon in the form of molasses or glucose to obtain a carbon to nitrogen ratio suitable for microbial proliferation. The product consists of a nearly pure culture of Pseudomonas fluorescens which is essentially free of common pathogenic organisms. The single-stage process reduces operational complexity and offers a potential cost reduction by eliminating the second stage by using a mutant of P. fluorescens. This mutant degrades uric acid in the presence of glucose and ammonium ion. A single-stage system

operates at a pH of about 7.5 without pH control; reduces start-up time; retains nitrogen content; and possibly improves culture stability. A detailed preliminary analysis of process economics indicates conditions under which the two-stage process is economically attractive. Economic feasibility of the single-stage process awaits nutritional trials of the product.

PB80-201874 PC **A04**/MF **A01**
DASI Industries, Inc., Chevy Chase, MD.
Evaluation of DASI FreeFallingFilm UHT (ultra-high temperature) Milk, Volume I, Project Activities.
Final rept.
Oct 79, 61p NSF/RA-790433
Grant NSF-AER77-04162

This volume describes a project to determine nutritional and biochemical data on milk which has been sterilized using the DASI FreeFallingFilm ultra-high temperature (UHT) system of the University of Maryland. Such data are useful in introducing sterilized milk to the U.S. as an energy conservation measure. The DASI unit operates on the principle of heating a free falling film of product by a saturated culinary (pure) steam atmosphere under pressure. The DASI system differs from other steam infusion heaters and conventional UHT heaters in that the product does not come into contact with metal surfaces hotter than itself. The DASI method provides an exceptionally uniform and rapid heat transfer which eliminates the cooked taste normally associated with UHT milk processed by conventional systems. The system is capable of sterilizing milk at 280F for 1.5 seconds. Protein denaturation is less than for conventional UHT systems, and DASI processed milk is suitable for use as a culture substrate. A summary of scientific findings, and a review of various papers and presentations which have been made to disseminate data developed by the project are included.

PB80-203300 PC **A02**/MF **A01**
Idaho Dept. of Fish and Game, Boise.
Commercial Fish and Fish Feed Production in Idaho.
Completion rept. Oct 78-Sep 79,
George W. Klonz, and Jerry Mallet. Apr 80, 13p
NOAA-80060404

Production of processed rainbow trout during 1978 was estimated at 22.5 million pounds at a value of $31.2 million. Catfish production was estimated at 400,000 pounds with a value of $457,600. Commercial trout producers were unwilling to provide figures this year. As a result estimates are approximations and may not be exact. Fish feed production in the state during 1978 calendar year increased over previous years, however this increase was not reported by processors.

PB80-203532 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Extension Div.
Care and Maintenance of Boilers in Food Processing Plants,
Frank Huang, William H. Mashburn, and J. Kenneth Riggins. 1979, 26p VPI-SG-79-11, NOAA-80060501

Food processing plants utilizing steam for can sterilization, retort cooking, pressurized cleaning, or other direct heating purposes, require a constant supply of live steam and thus a continuous supply of water to replenish water lost at steam. Improper water quality can tremendously reduce boiler efficiency because the impurities cause scale to be deposited on the heating surface; for example, a quarter-inch scale deposit increases fuel consumption by 25%. Boiler efficiency is also reduced, and energy wasted, when fuel combustion is not adequately controlled. Proper operation and maintenance procedures are also good safety practices. Most boilers operate above atmospheric pressure and could be dangerous if improperly operated or maintained. This manual briefly reviews basic boiler construction, water quality, maintenance, operating principles, and selection considerations.

PB80-203789 PC **A03**/MF **A01**
Federation of American Societies for Experimental Biology, Bethesda, MD. Life Sciences Research Office.
Evaluation of GRAS Monographs (Scientific Literature Reviews).
Final rept. 28 Mar 72-30 Mar 80.
1980, 31p FDA/BF-80/108
Contract FDA-223-75-2004
Report of Select Committee on GRAS Substances.

A group of qualified scientists designated the Select Committee on GRAS substances (SCOGS) has independently evaluated the safety of certain GRAS and prior-sanctioned substances. This final report includes the following information on each of the 118 SCOGS reports: substances evaluated, the dates of any public hearings, the SCOGS conclusion on each substance and the National Technical Information Service order numbers.

PB80-204944 PC **A05**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Sea Grant Project.
The Virginia Tech SeaGrant Seafood Tipline Project,
Jeffrey L. Howe, George J. Flick, Jr., Georgia W. Crews, and Joan Youngblood. 1978, 91p VPI-SG-78-07, NOAA-80060502

The idea behind these short messages was to interest and encourage consumers to use more of the food products obtained from the sea and to acquaint the public with the background, preparation, and handling of these products. The message delivery mechanism was, and continues to be, a common Code-A-Phone unit available from the local telephone company. Fifty-two weekly messages were prepared, a Tip-Line promotional plan was developed, and the service was initiated in the Hampton Roads area of Virginia on February 1, 1973.

PB80-205164 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Regulatory Impact Statement: Proteolytic Enzymes.
Staff rept.,
Elwin Guild, and Clark R. Burbee. Dec 79, 13p

Three regulatory options to authorize the use of proteolytic enzymes to tenderize the meat of livestock, except beef which is already approved, and poultry were assessed. The options are: (1) restricting use to beef, (2) restricting use to beef and the meat of all other mature animals and (3) unrestricted use. The analysis focused on the impact upon the supply of tender meat, prices for mature animals, and extent of use of the tenderizers.

PB80-205172 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Regulatory Impact Statement: Nitrate and Nitrite.
Staff rept.,
Robert J. Lenahan, and Clark R. Burbee. Jul 79, 12p

The economic impacts of a proposed label rule change to allow the sale of nitrate and nitrite-free processed meat products by their familiar product names in traditional cured meat product markets were assessed. Three options were evaluated to determine the least burdensome regulation. Impacts analyzed included those on product costs, prices and competition in the cured meat markets, consumer health and safety, anc cost of government regulation. The impact statement prepared for the Food Safety and Quality Service was used to satisfy requirements for regulatory review contained in Executive Order 12044.

PB80-209380 PC **A02**
Texas A and M Univ., College Station. Dept. of Animal Sciences.
Shelf-Life Studies on Carbon Dioxide Packaged Finfish from the Gulf of Mexico,
Harrell Banks, Ranzell Nickelson, II, and Gunnar Finne. c1980, 9p TAMU-SG-80-813, NOAA-80061102
Pub. in Jnl. of Food Science, v45 n2 p157-162 1980. Also pub. as Texas Agricultural Experiment Station Technical Article Number 15295.

Modified atmosphere packaging using CO2 was demonstrated to be effective in retarding the growth of microorganisms during storage of fresh fish from the Gulf of Mexico. At 4C, there was at least a log difference in bacterial counts at 2, 4, and 6 days between fish stored in CO2 as compared to control fish stored without CO2. While the CO2 atmosphere was shown to inhibit the growth of common spoilage types of bacteria such as gram-negative rods (Pseudomonas), stimulation of gram-postive bacteria such as Lactobacillus was also demonstrated. Fish stored at 4C, for 2-8 days in a modified atmosphere containing CO2 had lower TVN values than fish stored at the same temperature without CO2. The results indicate than an extension of the shelf-life of fresh fish can be obtained by packaging and storing the fish in a CO2 atmosphere.

6J. Industrial (Occupational) Medicine

EUR-5922 PC **A02**/MF **A01**
Commission of the European Communities, Luxembourg.
Accident Prevention Programme.
1978, 24p
U.S. Sales Only.

This study by the Steel Industry Safety and Health Commission was made within the context of the application by undertakings of the principles of accident and disease prevention previously adopted by the said Commission. It puts forward recommendations for the effective and gradual implementation of a programme of action on occupational health and safety in the various departments of an undertaking and in the undertaking as a whole. The methods proposed in this study are likely to be of interest to all undertakings in the metallurgical industry and other industrial sectors. (Atomindex citation 10:426527)

EUR-5923 PC **A02**/MF **A01**
Commission of the European Communities, Luxembourg.
Oxygen - Precautions to Be Taken in the Preparation of Plant and Equipment.
1978, 16p
U.S. Sales Only.

The inadequate maintenance and cleanness of equipment for use with oxygen under pressure is a frequent cause of spontaneous combustion in valves and fittings. Such accidents are always serious and frequently result in loss of life. This study by the Working Party 'Safety-Oxygen' of the Steel Industry Safety and Health Commission provides the most up-to-date information on this hazard and puts forward a draft specification for firms in the steel industry (or others using oxygen gas under pressure) and engineering consultants. The aim being to make manufacturers of the equipment and assembly firms comply with the conditions laid down. (Atomindex citation 10:426526)

INIS-mf-4597 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Act No. 245 of 13 May 1976 Amending Radiation Protection Act No. 110 of 1958.
1976, 2p
In Swedish.
U.S. Sales Only.

This Act adds a third paragraph to Section 1 of the Swedish Radiation Protection Act of 14 March 1958 to empower the Government to issue regulations when required from the radiation protection viewpoint to the effect that the provisions of the Act concerning technical devices emitting ionizing radiation and radiological work shall be applicable in whole or in part to certain types of devices which emit non-ionizing radiation or to work involving use of such devices. The Government may empower the administrative authority to issue such regulations. (Atomindex citation 10:421649)

INIS-mf-4598 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).

Ordinance No. 246 of 13 May 1976 Amending the Radiation Protection Ordinance No. 652 of 1958.
1976, 1p
In Swedish.
U.S. Sales Only.

Swedish Order No. 652 of 1958 embodying regulations for implementing the Radiation Protection Act of 1958 is amended by this Ordinance. It also empowers the State Institute for Radiation Protection to issue regulations under the Act. In addition, the State Institute may designate an authority to make decisions on its behalf in respect of certain provisions of the Act and in special cases to carry out the supervisory duties required. (Atomindex citation 10:421650)

INIS-mf-4601 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Ministerial Circular No. 73 of 1 December 1977 on the Medical Uses of Ionizing Radiation. Commentary.
2p
In French.
U.S. Sales Only.

This circular by the Minister of Public Health specifies the provisions for medical uses of sources of ionizing for radiation. Such uses are subject to prior notification and a licensing system as well as to inspections carried out by the Health Authorities and the National Commission for Nuclear Energy (CNEN). It follows the general decentralisation policy begun in Italy in 1972 and formulates recommendations to the regional competent bodies which are henceforth responsible for the surveillance of the medical uses of sources of ionizing radiation. (Atomindex citation 10:421646)

INIS-mf-4602 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Order of 6 October 1977 Defining the Characteristics of Each Type of Large Nuclear Installation.
1978, 2p
In French.
U.S. Sales Only.

This Order, made by the French Minister of Industry, Commerce and Crafts and the Minister of Labour, lays down the characteristics of large nuclear installations which should be included in the document provided for under Section 10 of decree No. 75-306 of 28 April 1975 on the protection of workers against the hazards of ionizing radiation in large nuclear installations. These include inter alia the reactor type, its nominal power, the nature and cladding of the fuel, the rate of loading/unloading of the fuel, provisions to prevent criticality risks outside normal operation of the reactor, controlled areas and the measures for protection against ionizing radiation. The Order also lays down the characteristics for plants for the preparation and treatment of irradiated nuclear fuels as well as the characteristics of facilities for the storage, use, manufacture and transformation of radioactive substances, and the maximum permissible annual quantities of radioactive releases. (Atomindex citation 10:421622)

INIS-mf-4603 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Order of 7 October 1977 of the Periodicity on Controls in Large Nuclear Installations.
1978, 1p
In French.
U.S. Sales Only.

This Order was made in implementation of Section 24 of Decree No. 75-306 of 28 April 1975 on the protection of workers against the hazards of ionizing radiation in large nuclear installations, and lays down that shields for protecting staff against radiation and for radiation emitting devices must be controlled every three years; sealed sources, their premises, ventilation and filtrating devices must be controlled every year and finally, radiation detecting devices must be controlled on a monthly basis. (Atomindex citation 10:421623)

PB80-201544 PC **A17**/MF **A01**
Advisory Council on Occupational Health and Occupational Safety, Toronto (Ontario).
Advisory Council on Occupational Health and Occupational Safety. Annual Report (2nd) April 1, 1979 to March 31, 1980.
1980, 386p

The theme of the report is the collecting, reporting, and analyzing of information as a critical aspect of occupational health and safety programs, beginning at the level of the company and extending up to the provincial and national levels. The issues dealt with are: policies and principles for occupational health and safety programs for small establishments; the role of advisory committees in the development of regulations; occupational hearing loss; prevention, compensation, and rehabilitation; policy and principles for using prophylactic agents in the workplace, and a report of the Scientific Task Force on Aluminum Inhalation Therapy; and policies and principles concerning economic impact analysis of occupational health and safety statutes and regulations. The final section of the report contains administrative matters. An appendix contains a variety of statistics on occupational fatalities, major disabilities, injuries and illnesses in Ontario, Canada.

PNL-2549(Sup.) PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Supplement to Safety Analysis Report. 306-W Building Operations Safety Requirement.
C. R. Richey. Aug 79, 36p
Contract EY-76-C-06-1830

The operations safety requirements (OSRs) presented in this report define the conditions, safe boundaries, and management control needed for safely conducting operations with radioactive materials in the Pacific Northwest Laboratory (PNL) 306-W building. The safety requirements are organized in five sections. Safety limits are safety-related process variables that are observable and measurable. Limiting conditions cover: equipment and technical conditions and characteristics of the facility and operations necessary for continued safe operation. Surveillance requirements prescribe the requirements for checking systems and components that are essential to safety. Equipment design controls require that changes to process equipment and systems be independently checked and approved to assure that the changes will have no adverse effect on safety. Administrative controls describe and discuss the organization and administrative systems and procedures to be used for safe operation of the facility. Details of the implementation of the operations safety requirements are prescribed by internal PNL documents such as criticality safety specifications and radiation work procedures. (ERA citation 04:054244)

6K. Life Support

AD-A086 488/4 PC **A03**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Diving Decompression Computer (XDC-2) Validation Dives, 36-54 msw. Phase 1. Preliminary Results.
Technical communication,
M. D. Kooner. Nov 79, 37p Rept no. DCIEM-TC-80-C-12
See also AD-A080 152.

The Canadian Forces have used decompression computers for a number of years. However, advances in electronics have allowed the older analogue computers to be replaced by more sophisticated digital electronic computers (XDC-2's) which monitor the diver's depth and calculate the safe depth in real time. An operation lasting four weeks was conducted at DCIEM utilizing the newly acquired Deep Diving Facility as the vehicle to test the operational diving envelope of the XDC-2 Decompression Computer at 36-54 msw. Ultrasonic Doppler monitoring techniques were used throughout the series of dives to measure bubble activity in the pulmonary artery. The initial results would seem to elucidate the XDC-2 computer envelope by adding more information and more clearly defining the present calculated operational curves. As it was necessary to find a new reference point between the calculated curves, The Royal Navy Limiting Line as published in the R.N. Diving Manual (BR 2806) Table Eleven, was introduced as a datum line. It was found that there was a degree of correlation between the R.N. Limiting Line and that of the XDC-2 recalculated operational envelopes. Doppler ultrasonic monitoring results confirmed the severity of a dive and it was possible to grade a dive profile as mild, moderate or severe. (Author)

AD-A086 822/4 PC **A13**/MF **A01**
Navy Experimental Diving Unit Panama City FL
Evaluation of Commercially Available Open Circuit Scuba Regulators.
Test rept.,
James R. Middleton. Mar 80, 282p Rept nos. NEDU-2-80, NEDU-9-77

In June 1979 the Navy Experimental Diving Unit performed unmanned tests on 36 open circuit scuba regulators currently manufactured in the United States. Breathing resistance, respiratory work and first stage performance were evaluated. Results of these tests produced a new NEDU scuba regulator performance requirement to replace the current requirement taken from Mil-R-24169A. Of the 36 regulators tested, 7 regulators met the upgraded performance standard, 22 regulators and one full face mask met Mil-R-24169A, and 6 regulators did not meet Mil-R-24169A. (Author)

6L. Medical and Hospital Equipment

AD-A086 322/5 PC **A02**/MF **A01**
Jefferson Medical Coll Philadelphia PA
Development and Application of a Tendon Prosthesis for Early Functional Restoration of the Hand.
Annual rept. 1 Jul 71-30 Jun 72,
James M. Hunter. Sep 75, 15p
Contract DADA17-71-C-1112
See also report dated Sep 79, AD-A086 323.

The basic Hunter tendon, a dacron silicone mold prosthesis has been prepared in four sizes and shapes. The function of the prosthesis is being studied in the dog and primate with reference to gliding pseudo sheath formation, fluid formation and distal and proximal juncture attachments. A new tendon prosthesis design using the 304 and 316 L stainless steel yarn was designed. The yarn was covered with high pressure mold silicone process and its services are inert and smooth for implantation. The porous metal yarn, 250 micra, is exposed at the prosthetic end for end attachment investigation. Distal end attachment was studied using the porous tape. Forty-eight samples were placed into the metacarpal and forearm bones of the dog for periods of 4, 8, 12 and 16 weeks. Bone specimens were tensile tested. Tape shears were irregular and new weave techniques will be developed. It was determined from this study that 304 stainless steel tape was not acceptable for implantation due to tissue reactions. Strength union of 316 L metal tapes approached 50% of the initial strength of the 5 mm. tape. Cross tissue was studied using 160 gauge steel mesh screens in the vastus lateralis muscles of dogs. The evaluation of tensile testing was inconsistent and will be made available at a later date. Tenosynovial fluid in the canine tendon implants was studied and preliminary antibody titers will be established. The studies will continue using dacron tape and woven stainless stell tapes for the shaft of the flexible implant. Each study of end device fixation will include plates, screws, loop designs as well as mesh material to permit tissue ingrowth. (Author)

AD-A086 323/3 PC **A02**/MF **A01**
Jefferson Medical Coll Philadelphia PA
Development and Application of a Tendon Prosthesis for Early Functional Restoration of the Hand.
Annual rept. 1 Jul 72-30 Jun 73,
James M. Hunter. Sep 75, 20p
Contract DADA17-71-C-1112
See also report dated Sep 75, AD-A086 324.

Experiments were carried out to determine the feasibility of using stainless steel woven fiber tape

for distal attachment to bone. The steel tapes were placed in 5 mm osteoperiosteal bone flaps. Forty-eight samples remained in for 4, 8 and 12 weeks. They were studied by tensile testing and histological examination. Tape shearing was irregular leaving fibers imbedded in bone. It was concluded that 316 L material approached 50% initial strengths. It would be necessary to make tape fiber textile rearrangements to improve porosity and again the study showed that 304 stainless steel was not acceptable. Porous metal ingrowth study should be continued. The proximal end attachment study was continued in the soft tissues of dog muscle and tendons. New materials were studied using DuPont Fiber B and paralytic graphite fiber. Various types of tape configurations are being studied to permit silicone surface attachment and porosity for tissue ingrowth.

AD-A086 324/1 PC **A02**/MF **A01**
Jefferson Medical Coll Philadelphia PA
Development and Application of a Tendon Prosthesis for Eariy Functional Restoration of the Hand.
Annual rept. 1 Jul 73-30 Jun 74,
James M. Hunter. Sep 75, 13p
Contract DADA17-71-C-1112
See also report dated Sep 75, AD-A086 325.

Previous studies on prosthetic end attachment to bone indicate that porous metal tapes showed a fall-off in tensile strength after 12 weeks. During this period folded 316 L stainless steel screens were implanted (number 58 mesh - 325 micro pore size, number 80 mesh, 180 micro pore size, number 120 mesh, 150 micro pore size) into the metacarpal bones of canine sheperd dogs. Tensile testing on 96 specimens was carried out at 4, 8, 12 and 16 weeks. Pull-out strengths were approximately double those done with metal tapes. (Author)

AD-A086 325/8 PC **A02**/MF **A01**
Jefferson Medical Coll Philadelphia PA
Development and Application of a Tendon Prosthesis for Early Functional Restoration of the Hand.
Annual rept. 1 Jul 74-30 Jun 75,
James M. Hunter. Sep 75, 15p
Contract DADA17-71-C-1112
See also report dated Sep 75, AD-A086 322.

The fiber Kevlar(R)49 (DuPont) was woven by Bally Ribbon Mills into 5 mm. tapes with approximate tensile strengths of 150 kg. The tape was coated with medical grade silicone (silastic) tensile tested and flex tested at the Extracorporeal Company. Test design machines were made to our specifications. The implant is tested at 90 degree of flexion with an excursion of 3 cm. 5 kg. weight, 100 cycles per minute. Preliminary toxicology in canine implants of porous Kevlar tape showed good tissue compatibility.

CEA-BIB-214(2) PC **A06**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Documentation.
Scintigraphic Instruments and Techniques in Nuclear Medicine.
B. Bomand, and F. Soussaline. Jan 78, 109p
In French.
U.S. Sales Only.

A short survey of data processing techniques in medical scintigraphy is presented. Three lists of abstracts being firstly from reviews, secondly from proceedings, and thirdly of reports and thesis, are presented as an addendum to the bibliography CEA-BIB-214, for the period 1975 up to march 1977. An index of authors and subjects is included. Finally an appendix with 18 patents is attached. Several bibliographical reviews: Excerpta Medica (Nuclear Medicine) Abstract Journal, INIS Atomindex, Nuclear Science Abstracts, together with a number of special journals and documents, recently published, have been used for this work . (Atomindex citation 09:411221)

INIS-mf-4655 PC **A10**/MF **A01**
Vrije Univ., Amsterdam (Netherlands).
Computer Tomography of Intracranial Tumours and Hematomas.
J. T. J. Tans. 1978, 205p
In Dutch.Thesis.
U.S. Sales Only.

The value of computed tomography (CT) for the diagnosis of intracranial tumors and hematomas was investigated in a retrospective study comprising 220 patients. All C.T.scans are reviewed and described in detail. To assess the diagnostic accuracy, the original interpretation of the C.T.scans was compared with that of conventional neuroradiological and neurophysiological examinations. The aspect on C.T. of the various types of tumors and hematomas proved to vary widely and specific features were seldom seen. This holds particularly for the malignant tumors. Benign tumors such as meningeomas, adenomas and neurilemmomas showed a rather easily identifiable and almost identical picture of the C.T.scan, and diagnosis had to be based mainly on differences in localization. The hematomas, with the exception of the older intracerebral ones, showed the most characteristic C.T.abnormalities. (Atomindex citation 10:426485)

PAT-APPL-6-129 982 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Steel Wire Pressure Aesthesiometer.
Patent Application,
Frank N. Kantani. Filed 11 Mar 80, 23p PB80-208754
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to neurological test apparatus, and more particularly to sensory response testing equipment for use in the assessment of abnormal sensory patterns such as those associated with leprosy neuritis and similar diseases.

PAT-APPL-6-141 764 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Illuminated Surgical Instrument.
Patent Application,
Cornel Hilarion Petrassevich. Filed 21 Apr 80, 16p PB80-208721
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to an illuminated retractor or speculum, and more particularly to a surgical retractor or speculum or the like having an improved functional configuration and provided with means for illuminating the interior of a natural body cavity or a cavity formed by incision or a wound.

PAT-APPL-6-144 043 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Optical Sensor of Plasma Constituents.
Patent Application,
Jerome S. Schultz. Filed 28 Apr 80, 19p PB80-208762
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention relates to devices for measuring the concentration of specific constituents in blood in the body, or in other complex fluid media.

PATENT-4 209 300 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Hemoglobin-Oxygen Equilibrium Curve Analyzer.
Patent,
Lawrence E. Thibault. Filed 25 Sep 78, patented 24 Jun 80, 6p PB80-210941, PAT-APPL-945 130 Supersedes PB-289 171.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is a system for obtaining a hemoglobin-oxygen equilibrium curve for a sample of concentrated hemoglobin solution or whole blood. Gaseous oxygen and/or nitrogen is used to oxygenate or deoxygenate the sample. The exchange takes place across a gas-receiving cup-shaped semipermeable membrane in a temperature-controlled chamber containing the sample, in an annular space defined between the cup-shaped gas-receiving membrane and the chamber wall. The rate of oxygen transport into and out of the sample is continuously calculated by means of a microcomputer. Simultaneously the solution pO2 is measured by means of a Clark electrode exposed to the sample. From the oxygen transport rate calculation and the pO2 measurement, the percent O2 saturation is calculated and is plotted against the change in pO2. Oxygen can be exchanged bidirectionally with the sample across the semipermeable membrane, which is positioned concentrically in a cylindrical sample cavity. The sample solution is maintained well-stirred by a magnetic stirrer provided in the cavity.

PB80-199102 PC **A03**/MF **A01**
Thermo Electron Corp., Waltham, MA.
Fabrication of Implantable Artificial Heart Devices and Components.
Annual rept. Jun 79-Apr 80,
V. Poirier, and S. Buczak. Apr 80, 47p TE4269, NIH-N01-HV-92907-1
Contract N01-HV-9-2907
See also PB80-133 846.

This report describes the fabrication activities conducted in support of NHLBI's Artificial Heart Program. The devices fabricated are used primarily by other NHLBI contractors conduction research and development in the artificial heart area. During the past year, axisymmetric blood pumps, pusher-plate blood pumps, pump control systems and mock circulatory loop components were fabricated and delivered as directed by the program office. In addition, a comprehensive, real time, endurance test of blood pump bladders was carried out.

PB80-199888 Not available NTIS
National Bureau of Standards, Washington, DC.
The Measurement of Absorbed Dose and Dose Gradients.
Final rept.,
W. L. McLaughlin. 1980, 29p
Pub. in Proceedings of Seminar on Radiation Sterilization of Plastic Medical Devices, University of Lowell, MA, March 28-29, 1979, Radiat. Phys. Chem. 15, p9-38 1980.

The more reliable systems and procedures of dosimetry for radiation sterilization applications are described, along with sources of uncertainty and ways to achieve optimum accuracy and reproducibility. Dosimetry practice in production must be accompanied by correct methods of dosimeter calibration to achieve measurement assurance and quality control. For routine use and for determination of dose distributions, certain thin-film dosimeters satisfying cavity-theory requirements are most suitable.

PB80-201452 PC **A08**/MF **A01**
Avco Everett Research Lab., Inc., Everett, MA.
Improve Test Procedures for the Evaluation of Biomaterials in Contact with Blood.
Annual rept. 28 Jun 77-27 Jun 78,
R. D. Cumming, D. M. Lederman, and E. Nyilas. Oct 79, 166p NIH-N01-HV-4-2961-4
Contract N01-HV-4-2961
See also report dated Apr 78, PB-295 598.

Evaluation of the ex vivo (canine) thromboresistance of candidate biomaterials designated by the Program Office, was continued under the experimental conditions of the Stagnation Point Flow Experiment (SPFE). The materials tested during this reporting period were of several different types including, grafted hydrogels, carbon coatings, glow discharge polymers, and polyurethanes. The application of a modified SPFE for use as an in vitro system that would permit the correlation of results between human and canine blood (heparinized or citrated) is described.

PB80-202609 PC **A04**/MF **A01**
Mayo Foundation, Rochester, MN.
Blood Compatibility of Circulatory Assist Devices.
Annual rept. 1 Jul 79-31 Mar 80,
P. Didisheim, M. K. Dewanjee, D. N. Fass, V. Fuster, and K. E. Holley. 30 Jun 80, 74p NIH-N01-HV-9-2915
Contract N01-HV-9-2915

Prepared in cooperation with Minnesota Univ., Minneapolis.

An integrated approach has been undertaken to develop methods which will predict the thrombogenicity of implanted cardiovascular prostheses. The approach consists of (1) physical characterization of biomaterials under study; (2) assessment of cellular elements and fibrin depositing on these materials following exposure to native or heparinized blood in a flow chamber at controlled surface shear rate; (3) implantation of materials as patches in the aorta and pulmonary artery (high- and low-pressure sites) of experimental animals, followed by imaging of 111Indium-labeled platelet deposition on the implants and platelet survival, and (4) pathologic estimation of implant-induced changes and distribution of labeled platelets at autopsy. Foxhounds and miniature pigs are compared throughout. Materials evaluated are Woven Dacron, Gore-Tex Vascular Graft, and Teflon Felt. Preliminary results indicate: (1) difference in crystallinity between the 2 Teflons; (2) differences in blood interaction among the 3 materials in the flow chamber, Gore-Tex being the least 'reactive' surface; (3) differences in platelet adhesion of dog versus pig blood in the flow chamber, dog platelets being more 'adhesive'; (4) demonstration of 111In-labeled platelet deposition on all 3 materials by imaging after implantation; and (5) shortening of platelet survival at the time of surgical implantation, especially in dogs, followed by a rapid return to or toward preoperative values postoperatively.

SAAS-239 PC **A04/MF A01**
Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German D.R.).
Comments on the Legal Basis and the Licensing Procedure for the Operation of Medical X-Ray Equipment.
W. Koenig, B. Menzel, and P. Taschner. 1978, 55p
In German.
U.S. Sales Only.

The relevant statutory provisions dealing with planning, design, construction and operation of medical X-ray equipment are explained and detailed advice is provided regarding the preparation of the documentation which must be submitted to the SAAS in the framework of a licensing procedure, and the performance of prescribed in-plant radiation protection supervision. This is an updated and enlarged version of Report SZS-11/71. (Atomindex citation 10:434005)

6M. Microbiology:

BCRA-56 PC **A02/MF A01**
British Carbonization Research Association, Chesterfield (England).
Micro-Organisms Occurring in the Activated-Sludge Treatment of Carbonization Effluents: Preliminary Studies.
Nov 78, 24p
U.S. Sales Only.

A variety of microbiological techniques were employed to study micro-organisms involved in the treatment of effluents by activated-sludge processes. These included light microscopy; isolation and cultivation of bacteria; the physical, microscopic and biochemical tests of bacterial classification and long-term monitoring of microbial populations. Bacteria were the most important and numerous of the micro-organisms in the activated-sludge treatment systems studied. A wide variety of species was found to be present. After bacteria, the most numerous micro-organisms were representative of two sub-classes of ciliated protozoa, i.e., the free-swimming ciliates (Holotricha) and the stalked ciliates (Peritricha), and the rotifers (Class Rotifera). They were probably important in producing a clear effluent and were generally associated with well-treated effluents. The occurrence of protozoa and rotifers was considered useful as an indicator of sludge condition. (ERA citation 05:021666)

PB80-202427 PC **A04/MF A01**
Scripps Clinic and Research Foundation, La Jolla, CA.
Investigation of the Persistence and Replication of Nuclear Polyhedrosis Viruses in Vertebrate and Insect Cell Cultures by the Use of Hybridization Techniques,
William Meinke, D. A. Goldstein, Cynthia Alvidrez, John Spizizen, and C. B. William. May 80, 58p
EPA-600/1-80-026
Contract EPA-68-02-2209
Prepared in cooperation with IRT Corp., San Diego, CA.

The Health Effects Research Laboratory, Research Triangle Park, conducts a coordinaged environmental health research program in toxicology, epidemiology, and clinical studies using human volunteer subjects. These studies address problems in air pollution, non-ionizing radiation, environmental carcinogenesis, and the toxicology of pesticides as well as other chemical pollutants. The Laboratory develops and revises air quality criteria documents on pollutants for which national ambient air quality standards exist or are proposed, provides the data for registration of new pesticides or proposed suspension of those already in use, conducts research on hazardous and toxic materials, and is preparing the health basis for non-ionizing radiation standards. The majority of the registered pesticides are chemical agents. A few, however, are biological in nature because the active ingredients are microbial. Of these micro-organisms, viruses are perhaps the most unique in structure, biology, and the intimacy of their parasitic relationship with their hosts. This report considers whether potential biohazards to human health and other biological components of the environment exist when insect viruses are used as pesticides.

PB80-207673 PC**$7.50/MF A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Twenty Five Years of Mycobacterial Taxonomy (1954-1979) in Celebration of the 25th Anniversay of the Runyon Groups,
George P. Kubica, Lawrence G. Wayne, and Loraine S. Good. 1980, 224p DHHS/CDC/BL-80/0072
Proceedings of the IWGMT (International Working Group on Mycobacterial Taxonomy) Conference on Systematics of the Genus 'Mycobacterium' (6th) held at Atlanta, Georgia on September 11-14, 1979.

A comprehensive look at the past, present, and future of mycobacterial taxonomy is presented in this 225-page volume. In celebration of the 25th anniversary of the Timpe and Runyon paper (J. Lab. Clin. Med. 44, 202, 1954) which heralded the era of 'atypical' mycobacteria, the Sixth Conference of Systematics of the Genus Mycobacterium, held in Atlanta, Georgia, September 11-14, 1979, enlisted the help of a panel of world experts to review a quarter century of mycobacteriology. Included in the volume are a historical exploration of the first recognition and crude categorization of the nontuberculous mycobacteria; the impact of these organisms on disease in humans and lower animals; a review of the use of the tuberculin skin test during this 25-year period; the evolution of mycobacterial taxonomy using such tools as numerical taxonomy, immunologic methods, phage typing, lipid analysis, and animal pathology; the definition of Mycobacterium and closely allied taxa; the adaptation of numerical taxonomy to the diagnostic laboratory; and genetic relatedness of mycobacterial species. Several free communications deal with use of new tools for classification of mycobacteria, studies on M. lepraemurium and M. intracellulare, and the epidemiology of mycobacterial disease in swine.

6N. Personnel Selection and Maintenance (Medical)

AD-A086 301/9 Not available NTIS
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Anthropometric Data Bank Library. Volume VI. The 1946 Survey of Army Female Separatees.
Data file,
Charles E. Clauser, and Paul Kikta. 1 May 80, mag tape USAF/DF-80/001
Magnetic tape. See also Volume 7, AD-A086 305. Documentation available.
Source tape is in EBCDIC character set. Tape(s) can be presented in standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

No abstract available.

AD-A086 302/7 Not available NTIS
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Anthropometric Data Bank Library. Volume IX. The 1977 Survey of US Army Women.
Data file,
Charles E. Clauser, and Paul Kikta. 1 May 80, mag tape USAF/DF-80/002
Magnetic tape. See also Volume 10, AD-A086 303. Documentation available.
Source tape is in EBCDIC character set. Tape(s) can be prepared in standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

No abstract available.

AD-A086 303/5 Not available NTIS
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Anthropometric Data Bank Library. Volume X. US Army Correlations.
Data file,
Charles E. Clauser. 1 May 80, mag tape USAF/DF-80/003
Magnetic tape. See also Volume 6, AD-A086 301. Documentation available.
Source tape is in EBCDIC character set. Tape(s) can be prepared in standard 7 or 9 track recording modes for one-inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

No abstract available.

AD-A086 304/3 Not available NTIS
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Anthropometric Data Bank Library. Volume VIII. The 1970 Survey of Army Aviators.
Data file,
Charles E. Clauser, and Paul Kikta. 1 May 80, mag tape USAF/DF-80/004
Magnetic tape. See also Volume 9, AD-A086 302. Documentation available.
Source tape is in EBCDIC character set. Tape(s) can be prepared in standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

No abstract available.

AD-A086 305/0 Not available NTIS
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Anthropometric Data Bank Library. Volume VII. The 1966 Survey of Army Personnel.
Data file,
Charles E. Clauser, and Paul Kikta. 1 May 80, mag tape USAF/DF-80/005
Magnetic tape. See also Volume 8, AD-A086 304. Documentation available.
Source tape is in EBCDIC character set. Tape(s) can be prepared in standard 7 or 9 track recording modes for one-half tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

No abstract available.

6O. Pharmacology

AD-A086 296/1 PC **A02/MF A01**
Texas Univ Health Science Center At Dallas

Angiotensin I Converting Enzyme (Kininase II) of the Brush Border of Human and Swine Intestine.
Technical rept. 15 May 79-15 Aug 80,
Patrick E. Ward, Martha A. Sheridan, Katy J. Hammon, and Ervin G. Erdoes. 23 May 80, 24p
Rept no. TR-19
Contract N00014-75-C-0807, Grant PHS-HL-16320

Mucosal brush border of human and swine small intestine is rich in angiotensin I converting enzyme or kininase II (ACE). The brush border of the intestinal mucosa was purified by centrifugation over a discontinuous glycerol gradient. Transmission electron micrographs showed that 90% of the isolated vesicles had a trilaminar membrance structure and glycocalix, characteristic to intestinal brush border. No significant contamination by other subcellular particles was evident. In the final purfied preparation the brush border marker enzymes sucrase, trehalase, and alkaline phosphatase were enriched 23, 18 and 17 fold from human intestine and 27, 26 and 20 fold from swine tissue. ACE was highly concentrated in the human and swine brush border. The specific activity of ACE in the human and swine brush border fractions was enriched 17 and 7.6 fold over the crude homogenate. Kininase activity was demonstrated by biossassy. These studies were also prompted by the use of the specific inhibitor of ACE, SQ 14225 or captopril, on a large scale in experimental animals and in hypertensive patients (11 - 14). Since this drug is given orally, it may inhibit ACE in the intestinal tract even before reaching the enzyme elsewhere in the organism.

AD-A086 350/6 PC **A04**/MF **A01**
Liverpool School of Tropical Medicine (England)
Chemotherapy of Leishmaniasis.
Final rept. Jul 77-Dec 78,
Wallace Peters. Dec 78, 54p
Grant DAMD17-77-G-9435
Supersedes report dated Apr 78.

Simplified screening procedures for in vivo evaluation in mice of potential antileishmanial compounds are described in this report. Data are provided on the antileishmanial activity of 12 WRAIR compounds and 6 other compounds against a visceral parasite, L.infantum (LV9), and two cutaneous parasites, L.major (LV39) and L.m.amazonensis (LV78). The taxonomic status of a number of newly isolated strains of Leishmania is described and an updated list of isolates maintained in the reference collection is appended. Other work has involved studies on antimonial leishmanicides in liposomes, separation of amastigotes from tissue using a cellulose column, purine and pyrimidine synthesis in L.m.amazonensis promastigotes and immunological studies of visceral and cutaneous leishmaniasis. (Author)

AD-A086 390/2 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Regional Sensitivity of Cyclic AMP and Cyclic GMP in Rat Brain to Central Cholinergic Simulation,
Robert H. Lenox, G. Jean Kant, and James L. Meyerhoff. 21 Apr 80, 11p
Pub. in Life Sciences, v26 n25 p2201-2209 1980.

No abstract available.

AD-A086 402/5 PC **A02**/MF **A01**
Army Inst of Dental Research Washington DC
A Comparison of the Inflammatory Response Produced by Commercial Eugenol and Purified Eugenol,
Joseph G. Webb, Jr., and Norman E. Bussell. 22 May 80, 14p

Eugenol is one of the major therapeutic agents in dentistry. The inflammatory response to purified and commercial eugenol are compared, and the inflammatory response to zinc oxide/eugenol prepared with either purified or commercial eugenol are also compared. The results indicate that eugenol is inflammatory but the impurities present in commercial eugenol increase the inflammatory response to eugenol and zinc oxide eugenol. (Author)

AD-A086 541/0 PC **A15**/MF **A01**
Associate Consultants Inc Washington DC
A Critical Review of the Drug/Performance Literature. Volume I.
Final rept. 1 Apr-30 Nov 79,
Lawrence A. Landry, Yves Douyon, Dahlia Gill, Francis Kilgour, and Dolores Landry. Dec 79, 345p
Contract DAMD17-79-C-9061
See also Volume 2, AD-A086 542.

In anticipation of requirements to perform research on the impact of psychoactive drug use upon military performance, the U.S. Army Medical Research and Development Command (USAMRDC) contracted with Associate Consultants, Inc. to perform and compile a series of original reviews and analyses of the domestic and international scientific literature of the past 20 years. Reviews were conducted by experts in psychopharmacology with the primary aims of: documenting the current state of knowledge of drug effects upon militarily relevant performance; documenting the gaps in knowledge of drug effects upon performance, particularly in situations analogous to those that may be created by rapid deployment of troops into continuous land warfare; and making recommendations for future research projects. The literature reviews are intended to establish a firm scientific basis for subsequent research programs and staff studies concerned with relating militarily-relevant performance capacity to various parameters of drug use. (Author)

AD-A086 542/8 PC **A14**/MF **A01**
Associate Consultants Inc Washington DC
A Critical Review of the Drug/Performance Literature. Volume II.
Final rept. 1 Apr-30 Nov 79,
Lawrence A. Landry. Dec 79, 310p
Contract DAMD17-79-C-9061
See also Volume 1, AD-A086 541.

In anticipation of requirements to perform research on the impact of psychoactive drug use upon military performance, the U.S. Army Medical Research and Development Command (USAMRDC) contracted with Associate Consultants, Inc. to perform and compile a series of original reviews and analyses of the domestic and international scientific literature of the past 20 years. Reviews were conducted by experts in psychopharmacology with the primary aims of: documenting the current state of knowledge of drug effects upon militarily relevant performance; documenting the gaps in knowledge of drug effects upon performance, particularly in situations analogous to those that may be created by rapid deployment of troops into continuous land warfare; and making recommendations for future research projects. The literature reviews are intended to establish a firm scientific basis for subsequent research programs and staff studies concerned with relating militarily-relevant performance capacity to various parameters of drug use.

AD-A086 650/9 Not available NTIS
Illinois Univ At Urbana-Champaign Dept of Psychology
Fever in Normal and Maternally Neglected Newborn Rabbits,
Naomi Kleitman, and Evelyn Satinoff. 1980, 9p
Contract N00014-77-C-0465, Grant NSF-BNS77-03151
Availability: Pub. in Fever, p197-205 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 673/1 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Psychology
Febrile Responses in Normal and Maternally Neglected Newborn Rabbits,
Naomi Kleitman, and Evelyn Satinoff. 1979, 2p
Contract N00014-77-C-0465, Grant NSF-BNS77-03151
Pub. in International Symposium on the Pharmacology of Thermoregulsion (4th), p102-104 1979.

No abstract available.

N80-27991/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Psychotropic Drugs on Gastric Ulcers Induced by Immobilization: Increased Protective Effect of Amitriptyline Caused by Chlordiazepoxide.
J. E. Blum, and A. Huerlimann. Jun 80, 6p NASA-TM-76197
Contract NASW-3199
Transl. Into English from Med. Pharmacol. Exp. (Switzerland), V. 15, No. 6, 1966 p 615-617. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By F. Hoffmann-la Roche and CO., Basel, Switzerland.

Amitriptyline, but not chlordiazepoxide, protects rats from the occurrence of gastric erosions and ulcers following immobilization. When, however, chlordiazepoxide is given together with amitriptyline the protective effect of the latter is markedly increased.

PAT-APPL-6-104 806 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
L-Acetyl Carnitine Infusion to Prevent Glucose and Fatty Acid Oxidation during Myocardial Ischemia, Anoxia, and Other Diseases.
Patent Application,
Austin Leo Shug. Filed 18 Dec 79, 20p PB80-208747
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention provides a method of preventing the accumulation of the toxic products of glucose and fatty acid metabolism during myocardial ischemia and other diseases by infusng L-acetyl carnitine or its racemic mixture with D-acetyl carnitine into the body in a dosage of about from 20 to 40 milligrams per kilogram of body weight. The L-acetyl carnitine may be used to replace glucose or fatty acids in situations where the body needs a quick source of energy.

PAT-APPL-6-145 350 PC **A03**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Irreversible Anti-Glucocorticoids.
Patent Application,
S. Stoney Simons, Jr. Filed 30 Apr 80, 29p
PB80-208689
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The use of cortisol-21-mesylate and dexamethasone-21-mesylate as inhibitors of glucocorticoid steroid hormone action is disclosed. These compounds were found to be irrevesible inhibitors of glucocorticoid action, for example, in both whole and broken rat hepatoma tissue culture cells. The compounds contain both the basic glucocorticoid structure and a reactive functional group capable of yielding a covalent receptor-steroid complex.

PB80-200231 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Health Resources Div.
Answers To Questions On Selected FDA Bureau of Biologics' Regulation Activities.
6 Jun 80, 81p HRD-80-55

The Food and Drug Administration's Bureau of Biologics regulates certain drugs, including those used to diagnose and treat allergies and to vaccinate people against a number of communicable diseases. This report answers questions by several Senators concerning: allergic product regulation; biological tests to ensure product safety, purity, and potency; tests to detect metal contaminants; adequacy of product labeling; real or apparent conflict-of-interest situations; and the relationship between the Bureau's intramural research activities and its regulatory responsibilities. GAO makes several recommendations to HEW and also recommends that the Congress amend the Public Health Service Act and the Federal Food, Drug, and Cosmetic Act to specifically require that drugs regulated by the Bureau meet effectiveness standards.

PB80-204688 PC **A03**/MF **A01**
Miami Univ., FL. Dept. of Dermatology.
Psoriasis Topical Chemotherapy Screening Program. Comprehensive Progress Report on Phase I.
Final rept. 1 Jul 77-31 Dec 78,

Gerald D. Weinstein. 5 Mar 80, 30p NIAMD/ABS-2-5-2223
Contract N01-AM-5-2223

The first two parts of a clinical screening program for evaluation of topical chemotherapeutic drugs in psoriasis was undertaken. Thirty drugs known to affect psoriasis clinically by inhibition of cell proliferation through various biochemical mechanisms were selected for study. The first part of this study included testing the drugs for skin irritation, selection of vehicles and concentrations, consideration of potential systemic toxicity from percutaneous absorption, and obtaining FDA approval. The second part of the study involved a clinical protocol consisting of a double-blind application of test agents to psoriatic plaques under occlusion (to maximize penetration). Drug effects were evaluated daily during the treatment and one week after therapy. Seven drugs showed clinical activity while 18 drugs had no effect. No systemic toxicity occurred. The report outlines an effective topical screening program of systemic drugs. Recommendations for expanded testing of the seven active drugs is included.

6P. Physiology

AD-A086 288/8 PC **A04**/MF **A01**
New York Univ NY Neuromagnetism Lab
Magnetic Fields of the Cerebral Cortex,
Samuel J. Williamson, and Lloyd Kaufman. 15 Jun 80, 51p Rept no. 6
Contract N00014-76-C-0568

The observed patterns over the scalp of magnetic fields evoked by visual, somatic, and auditory stimuli are analyzed to deduce the position and depth of the equivalent current dipole generating source. Expressions are developed for both sphere and half space models for the head, and graphs are presented to correct for the use of a pickup coil of finite diameter. For all three responses, the position of the generating source is deduced to lie in the corresponding primary projection area of the cortex. (Author)

AD-A086 312/6 Not available NTIS
Defence Research Establishment Ottawa (Ontario)
The Measurement of Rectal and Testis Temperature in Conscious Mice, with Observations on the Effect of Direct Heating,
A. B. Cairnie, L. F. Prud'homme-Lalonde, R. K. Harding, and M. Zuker. 23 Jul 79, 6p Rept no. DREO-812
Summaries in French and German.
Availalbility: Pub. in Physics in Medicine and Biology, v25 n2 p317-322 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 435/5 Not available NTIS
Johns Hopkins Univ Baltimore MD School of Medicine
Two Mechanisms of Cell-Mediated Cytotoxicity: Ca++ Transport Modulation by Lymphotoxin and Transmembrane Channel Formation by Antibody and Nonadherent Spleen Cells,
M. M. Mayer, M. K. Gately, M. Okamoto, M. L. Shin, and J. B. Willoughby. 1979, 13p
Contract N00014-75-C-0142
Availability: Pub. in Annals of the New York Academy of Sciences, v332 p395-407, 28 Dec 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 547/7 PC **A02**/MF **A01**
New York Univ NY
Evoked Magnetic Fields Reveal Different Visual Areas in Human Cortex,
Douglas Brenner, Yoshio Okada, Edward Maclin, Samuel J. Williamson, and Lloyd Kaufman. 15 Jun 80, 15p Rept no. 7
Contract N00014-76-C-0568, Grant PHS-EY-02059

Detailed maps of the patterns of steady state magnetic fields evoked by visual stimuli were constructed from measurements made over the occipital region of the head. The maps indicate the presence of at least two, and for some subjects three, current sources having different response properties, e.g., differing relationships between the response latency and spatial frequency of the display. (Author)

AD-A086 548/5 PC **A02**/MF **A01**
New York Univ NY
Application of a SQUID to Measurement of Somatically Evoked Fields: Transient Responses to Electrical Stimulation of the Median Nerve,
Yoshio C. Okada, Lloyd Kaufman, Douglas Brenner, and Samuel J. Williamson. 15 Jun 80, 13p Rept no. 8
Contract N00014-76-C-0568

Magnetic field measurements have detected and localized transient neural activity evoked in the primary somatosensory projection area of the cortex following stimulation of the medial nerve. Components of the magnetic response are similar to those observed for potential variations recorded directly on the surface of the brain and display comparable localization, in contrast with scalp recorded evoked potentials which are widespread over both hemispheres. (Author)

AD-A086 645/9 PC **A05**/MF **A01**
Houston Univ TX Dept of Mechanical Engineering
Mechanics of Pulsatile Flows of Relevance to the Cardiovascular System,
A. K. M. Fazle Hussain. 1977, 94p
Contract N00014-76-C-0128, Grant NSF-ENG75-15226
Pub. in Cardiovascular Flow Dynamics and Measurements, ch15 p541-632 1977.

No abstract available.

AED-Conf-77-670-000 PC **A99**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Trace Element Metabolism in Man and Animals. Proceedings.
M. Kirchgessner. 1977, 684p CONF-770731-
Symposium on trace element metabolism in man and animals, Freising-Weihenstephan, F.R. Germany, 25 Jul 1977.
U.S. Sales Only.

Uptake, distribution, storage, excretion of different trace elements and resulting disturbances are investigated in blood and organs in animal experiments and in human diagnostics with the aid of radioisotopes. Apart from this, nutritional disturbances are mentioned. Finally, future aspects of physiological trace element examinations are listed. (Atomindex citation 10:441216)

INIS-mf-5175 PC **A07**/MF **A01**
Giessen Univ. (Germany, F.R.). Zentrum fuer Innere Medizin.
Behavior of Homologous exp 125 I Fibrinogen after Thrombin and Ancrod Infusion in Rabbits.
R. Setter. 1977, 116p
In German.Diss. (M.D.).
U.S. Sales Only.

The behavior of radioactively labelled fibrinogen after infusion of thrombin or ancrod is investigated. Common factors and differences in the behaviour of fibrinogen after infusion of these two enzymes, which act proteolytically on the fibrinogen, are dealt with. Rabbits received an i.v. injection of homologous exp 125 I-fibrinogen 3 days before ancrod or thrombin infusion. On the day of the experiments, one group of animals received an ancrod infusion (1.5 U/kg body weight for 30 minutes), the other a thrombin infusion (600 U/kg body weight for 60 minutes). Intravenous ancrod and thrombin infusions lowered the fibrinogen level to 30% or 50% of the initial value due to intravascular coagulation. About 50% of the exp 125 I fibrinogen was transformed after ancrod exposure into a non-coagulating fraction of fibrinogen derivatives which produces no fibrinolytic decomposition products. (Atomindex citation 10:473475)

INIS-mf-5200 PC **A05**/MF **A01**
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Bio- und Geowissenschaften.
Investigations on the Distribution and Decorporation of Inorganic Mercury. In Vivo Investigations Using Rats. In Vitro Experiments Using Human Serum.
W. Schleicher. 11 Jan 77, 81p
In German.Diss. (D.Sc.).
U.S. Sales Only.

The mercury excretion with exp 203 Hg poisoned rats was measured whereby the effectiveness of various chelate therapies with sodium 2,3-dimercaptopropane sulphonate (DMPS) and sodium mercapto-ethyl iminodiacetate (MEIDA) was investigated. Certain combinations of the chelating agent lead to an almost complete excretion of the heavy metal. Rats treated with DMPS/MEIDA or MAIDA/DMPS showed the lowest Hg content in the organs after 11 days. The consequences of the results in practice are discussed. The distribution of inorganic Hg in human serum was studied in vitro. A dose-dependent bonding to the serum proteins was found. Albumin was found as main bonding position for the metal at higher Hg concentrations. The 14C labelled chelating agent DMPS is loosely bonded to all serum proteins. The decorporation effectivity of DMPS and MEIDA was compared on Hg-poisoned human serum. DMPS removed under the same test conditions about five times as much mercury as MEIDA from the serum proteins. At higher Hg concentrations, the chelating agent almost entirely removed the albumin-bonded mercury. The effects of the in vitro findings on the Hg distribution in the organism are discussed. (Atomindex citation 10:476619)

6Q. Protective Equipment

AD-A086 739/0 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Flame Testing of Two Samples of Exposure Suit Material.
Final rept.,
Frank H. Jacobson. 9 May 80, 15p Rept no. NADC-80097-60

Reported deficiencies in authorized quick-donning ship-abandon type exposure suits has prompted use of other suits made of materials with unknown flame and heat retardant properties. Therefore, tests were requested to be addressed first to the question of flammability of the material, and second to the question of heat retardation by the material. The materials tested may provide better protection against standard 3-second exposures to fuel fires than any fabrics previously tested in this laboratory. However, the protection falls off sharply as the exposure is continued.

AD-A086 742/4 PC **A06**/MF **A01**
Army Natick Research and Development Command MA Clothing Equipment and Materials Engineering Lab
The Psychomotor Performance of Men and Women Wearing Two Types of Body Armor.
Technical rept.,
Carolyn K. Bensel, Darrell S. Fink, and Sirvart A. Mellian. Mar 80, 117p NATICK/CEMEL-195, NATICK-TR-80/014

This study was conducted to determine the effects of load-carrying equipment (LCE) and two types of fragmentation protective armor vests, Standard B Fragmentation Protective Body Armor (STD B) and the Personnel Armor System for Ground Troops (PASGT), on body flexibility, rate of movement, psychomotor coordination, manual dexterity, and effort exerted for task performance. Twelve men and 12 women, outfitted in utilities, performed the battery of 16 tasks under each of the following clothing conditions: utilities alone, STD B armor, PASGT armor, LCE, STD B armor + LCE, and PASGT armor + LCE. In general, performance levels were highest when the utilities were worn without any additional items and lowest when the STD B vest was worn in conjunction with the LCE. The STD B armor impaired certain aspects of psychomotor performance, particularly body flexibility, to a greater extent than the PASGT vest did. The collar and shoulder designs seemed to be the critical features responsible for the superior perform-

ance achieved with the PASGT vest. After the data had been transformed to remove effects accounted for by difference is the basic capabilities of men and women, two tasks which required arm movements were found to be significantly affected by the sex variable. The women's performance of these movements was impaired relative to the men's because of the excessive length of the armor across the women's shoulders. (Author)

AD-A086 743/2 PC **A03**/MF **A01**
Navy Clothing and Textile Research Facility Natick MA
Thermal Insulation Materials for Diver's Underwear Garment.
Final technical rept. 1977-1978,
Norman F. Audet, George M. Orner, and Zelig Kupferman. Feb 80, 31p Rept nos. NCTRF-139, 2-78
Presented at the Annual Winter Meeting of the American Society of Mechanical Engineers (ASME), Ocean Engineering Div., San Francisco, CA, 12-15 Dec 78.

The Navy Clothing and Textile Research Facility (NCTRF) conducted studies on commercially available foam and fibrous thermal insulating materials to determine those which would be effective in a diver's dry-suit underwear garment. An effective insulation had to allow the pressurized gaseous environment existing within the diver's dry suit to permeate the insulation, have good compressional resistance at hydrostatic pressures up to 2 psi (13.8 kPa), and provide an intrinsic thermal insulation value of 1.0 to 1.5 clo. Evaluations of candidate materials and comparisons with existing materials used in diver's dry-suit underwear indicated that a fine pore open cell foam and the polypropylene microfiber batt material having densities of approximately 0.12 gr/c cm and 0.05 gr/c cm and thermal insulation resistance of 1.8 and 2.11 clo/cm at 2 psi (13.8 kPa), respectively, would meet the thermal requirements for the underwear garment and would be superior to those presently being used. The foam compressed less than 30% at 2 psi (13.8 kPa). The fibrous material compressed 60% at 2 psi (13.8 kPa) but had such a high specific clo value incompressed (2.27 clo/cm) that thermal resistance at 2 psi (13.8 kPa) was still estimated to be 2.11 clo/cm.

AECL-6175 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Facepiece Leakage and Fitting of Respirators.
J. M. White. May 78, 15p CONF-780115-
Conference on personal protective equipment, Toronto, Canada, 23 Jan 1978.
U.S. Sales Only.

The ways in which airborne contaminants can penetrate respirators and the factors which affect the fit of respirators are discussed. The fit of the respirator to the face is shown to be the most critical factor affecting the protection achieved by the user. Qualitative and quantitative fit testing techniques are described and their application to industrial respirator programs is examined. Quantitative measurement of the leakage of a respirator while worn can be used to numerically indicate the protection achieved. These numbers, often referred to as protection factors, are sometimes used as the basis for selecting suitable respirators, and this practice is reviewed. (Atomindex citation 09:411365)

6R. Radiobiology

AD-A086 440/5 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Dosimeter Directional Dependence, RADIAC.
Final rept. on test operations procedures.
29 Feb 80, 13p Rept no. TOP-6-2-561

This report provides a method for determining the directional dependence characteristics of direct reading dosimeters. The dosimeter is oriented in various positions and angles with reference to a calibrated radiation source, thus providing data for evaluating the directional accuracy.

AD-A086 468/6 PC **A05**/MF **A01**
Franklin Research Center Philadelphia PA Science Information Services Organization
Biological Effects of Nonionizing Electromagnetic Radiation. Volume IV. Number 4.
Quarterly rept. Mar-Jun 80,
Bruce H. Kleinstein, and Sheryl A. Dyner. Jun 80, 80p Rept no. 80G-C5003-01-VOL-4-4
Contract H0-A01-78-1157
A Digest of Current Literature. See also Volume 4, Number 3, AD-A082 367. Errata sheet inserted.

This quarterly digest presents current awareness information on the biological effects of nonionizing electromagnetic radiation (microwave and radio frequency) in the range of 0 Hz to 100 GHz. The effects of magnetic and electric fields (static and alternating) are also covered. Each issue contains abstracts of English and foreign current literature, summaries of ongoing research investigations, news items, and a directory of meetings and conferences. (Author)

AD-A086 479/3 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Implications of the Corneal Temperature Range in the Prediction of Laser Thermal Damage.
Final rept. 1 Jan 78-1 May 79,
George W. Mikesell, Jr., and Kenneth L. Schepler. 19 Sep 79, 9p Rept no. SAM-TR-79-390
Pub. in American Jnl. of Optometry and Physiological Optics, v57 n4 p228-235 Apr 80.

No abstract available.

AECL-5721 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.
Radiation Biology for the Non-Biologist.
D. K. Myers. Jun 78, 44p
U.S. Sales Only.

This colloquium introduces some of the general concepts used in cell biology and in the study of the effects of ionizing radiation on living organisms. The present research activities in radiation biology in the Biology Branch at the Chalk River Nuclear Laboratories cover a broad range of interests in the entire chain of events by which the initial radiation-induced changes in the living cell are translated into significant biological effects, including the eventual production of cancers and hereditary defects. The main theme of these research activities is an understanding of the mechanisms by which radiation damage to DNA (the carrier of hereditary information in all living organisms) can be actively repaired by the living cell. Advances in our understanding of these processes have broad implications for other areas of biology but also bear directly on the assessment of the biological hazards of ionizing radiation. The colloquium concludes with a brief discussion of the hazards of low-level radiation. (Atomindex citation 10:426170)

AECL-6094 PC **A06**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Progress Report, Biology and Health Physics Division, October 1 to December 31, 1977.
121p PR-B-116
U.S. Sales Only.

Provisional research results are reported in the fields of health physics, environmental research, population research, and biology. (Atomindex citation 10:427586)

AECL-6201 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Measurement of Organ Doses from External gamma -Radiation in the Environment of a Nuclear Research Laboratory.
A. R. Jones. Jun 78, 10p CONF-780657-4
23. meeting of the Health Physics Society, Minneapolis, MN, USA, 18 Jun 1978.
U.S. Sales Only.

Thermoluminescent dosimeters (TLD) are used to monitor the gamma -ray exposure in the environment at the Chalk River Nuclear Laboratories. To relate the exposure to the doses absorbed by humans in this environment a set of measurements has been made of the doses at various sites within a phantom, placed out-of-doors, while measuring the exposure simultaneously. The measurements have been made with sensitized LiF-TLD's for exposures lasting several months in order to obtain adequate accuracy at the low exposure rates (5 - 50 mu R/h) encountered. The exposure was measured with TLD's placed one metre from the ground and on four sides of the phantom and two metres away. Measurements made of the internal radioactivity of the phantom showed that this contributed less than 0.2 mu R/h to the TLD's lodged within the phantom. (Atomindex citation 09:411370)

AED-Conf-77-408-002 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
News in Radiation Protection.
O. Rosenbaum. 1977, 6p CONF-771186-1
In German.Industrial safety and occupational medicine with international exhibition, Duesseldorf, F.R. Germany, 23 Nov 1977.
U.S. Sales Only.

The major changes in the new Radiation Protection Ordinance compared to the old one are briefly discussed from the practical point of view. (Atomindex citation 09:384100)

AERE-PR/EMS-5 PC **A07**/MF **A01**
UKAEA, Harwell (England). Atomic Energy Research Establishment.
Environmental and Medical Sciences Division Progress Report January - December 1977.
W. M. Hainge. Jul 78, 138p
U.S. Sales Only.

The report includes the following topics: inhalation toxicology and radionuclide analysis; aerosols and metabolic studies - whole-body counting; dosimetry research; personnel dosimetry; applied radiation spectrometry; radioactive fallout; environmental analysis; and atmospheric pollution; a list of current publications of the Division is included. (Atomindex citation 09:419362)

AERE-R-8989 PC **A02**/MF **A01**
UKAEA, Harwell (England). Atomic Energy Research Establishment.
Calculation of Committed Dose Equivalent from Intake of Tritiated Water.
D. V. Law. Aug 78, 16p
U.S. Sales Only.

A new computerized method of calculating the committed dose equivalent from the intake of tritiated water at Harwell is described in this report. The computer program has been designed to deal with a variety of intake patterns and urine sampling schemes, as well as to produce committed dose equivalents corresponding to any periods for which individual monitoring for external radiation is undertaken. Details of retrospective doses are added semi-automatically to the Radiation Dose Records and committed dose equivalents are retained on a separate file. (Atomindex citation 10:433231)

CEA-N-1996 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Survival of Germinal Cells of the Male Rat after Exposure to 14 and 50 MeV Neutrons and R.B.E.
G. Lemaire, G. Grillon, and A. Ricourt. Oct 77, 34p
In French.
U.S. Sales Only.

No significant differences could be demonstrated between male rat germinal cell survivals to 14MeV and up to 50 MeV neutrons respectively. The survivals are well fitted by an exponential model (D sub 0 = 289 rads) logically situated between the models concerning exp 60 Co gamma rays and fission neutrons. On the basis of the testes weight loss after irradiation, the experimental results gave EBR ranging from 10 to 1.3 for survival rates from 92 to 2%. (Atomindex citation 10:437024)

CEA-R-4931 PC **A06**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.

Physical and Microdosimetric Studies of Neutron BEAMS Used in Radiobiology.
These (3e Cycle),
Bernard Lavigne. Oct 78, 155p
In French.
U.S. Sales Only.

Microdosimetry is concerned with the energy imparted in microscopic regions irradiated with different radiations. The energy imparted is subject to random fluctuations. The probability distribution may be estimated by measurements or by computing code. The results obtained with a tissue-equivalent proportional counter of Rossi type are compared with those obtained by means of the computer code of DENNIS and EDWARDS. Beams of monoenergetic neutrons of 0.68 MeV, 2.18 MeV, 3.53 MeV, 5.5 MeV and 14.18 MeV, and fission neutrons were used. The computer code requires that neutron spectrum and W, the mean energy expanded in a gas per ion pair formed are determined. The first part of the report thus describes: -spectrometric measurements done with a NE 213 scintillator; -W measurements with a chamber operating alternately as ionization chamber and proportional counter. Results are given for H exp +, He exp +, C exp +, N exp + and O exp + ions in argon and tissue-equivalent gas in the energy range 25 keV - 500 keV. (Atomindex citation 10:472108)

CEA-R-4959 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Strontium 90 Levels in Human Bones Collected in 1977.
L. Jeanmaire, and F. Patti. Jan 79, 16p
In French.
U.S. Sales Only.

exp 90 Sr levels in human bones collected in the Paris area during 1977 are presented. Means are generally lower than in previous years. (Atomindex citation 11:496791)

CEGB-RD/B/N-3940 PC **A05**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Time and Dose in Carcinogenesis.
W. V. Mayneord, and R. H. Clarke. May 78, 86p
U.S. Sales Only.

Work on the implications of different forms of dose response relationships has been extended to include time as a variable, not only in time of irradiation but also in the time of appearance of effects following irradiation. The forms of relationships for time distribution of tumours revealed experimentally for both radiation and chemical carcinogens are first considered. It appears that much data may be correlated in terms of a log-normal distribution of tumour yield following the insult. Further, it is noted that there is evidence that the median time of tumour appearance may be a function of total dose received or even of dose rate for protracted exposure. Using numerical values of these parameters derived from the biological literature speculative studies have been made of the effects on dose response relationships of using a time distribution of tumour yield considering both uniform irradiation and point sources. The effects of using dose rate rather than dose to define the log-normal distribution of tumour appearance have also been investigated. It is assumed that biological response is directly proportional to dose but that that effect is distributed in time. From this linear assumption the appearance of non-linear dose response relationships and apparent thresholds is seen continually. Finally, both the importance of attempting analyses of biological data in terms of stochastic concepts and the need for biological data to test our hypotheses are emphasised. (Atomindex citation 10:430072)

CEGB-RD/B/N-4260 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Review of the Properties of Plutonium, Its Biological Effects, and Its Place in the Nuclear Fuel Cycle.
G. A. Harte. Mar 78, 50p
U.S. Sales Only.

After a brief description of the sources of plutonium and its physical, chemical and radioactive characteristics, an attempt is made to describe quantitatively the biological effects of plutonium intake as they are currently understood by the organisations concerned with radiological protection. The conceptual basis of protection standards as put forward by ICRP has recently undergone a change; the idea of limiting dose to a critical organ has been superseded by that of limiting the overall risk of carcinogenic and genetic effects. Limits on plutonium intake are discussed in the light of both concepts. Finally the role of plutonium in the nuclear fuel cycle is described. (Atomindex citation 10:433031)

CEGB-RD/B/N-4282 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Fundamentals of Radiological Protection. 1. Basic Radiation Physics.
A. J. Mill, M. W. Charles, and J. Wells. Apr 78, 35p
U.S. Sales Only.

A review is presented of basic radiation physics with particular relevance to radiological protection. The processes leading to the production and absorption of ionising radiation are outlined, and the important dosimetric quantities and their units of measurements. The review is the first of a series of reports presenting the fundamentals necessary for an understanding of the basis of regulatory criteria such as those recommended by the ICRP. (Atomindex citation 10:426665)

CEGB-RD/B/N-4284 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.
Fundamentals of Radiological Protection. 3. Biological Effects of Ionising Radiation.
M. W. Charles, J. Wells, and A. J. Mill. Apr 78, 17p
U.S. Sales Only.

A brief review is presented of the early and late effects of ionising radiation on man, with particular emphasis on those aspects of importance in radiological protection. The terminology and dose response curves, are explained. Early effects on cells, tissues and whole organs are discussed. Late somatic effects considered include cancer and life-span shortening. Genetic effects are examined. The review is the third of a series of reports which present the fundamentals necessary for an understanding of the basis of regulatory criteria, such as those of the ICRP. (Atomindex citation 10:426286)

CENA-BC-048 PC **A02**/MF **A01**
Centro de Energia Nuclear na Agricultura, Piracicaba (Brazil).
32P Detection in Animal and Plant Samples Using Cerenkov.
V. F. Nascimento Filho, and A. O. Lobao. 20 Sep 77, 25p
In Portuguese.
U.S. Sales Only.

exp 32 P detection methodology in animal and plant tissue using the Cerenkov effect, liquid scintillation and Geiger-Muller techniques is studied. The Cerenckov effect shows to be more efficient as to sensitivity, sample preparation, back ground and negligible cost per sample. Comparing the detection by means of Cerenkov effect with that by GM, the relative counting efficiency is about 100 times and 1,5 to 4 comparing to liquid scintillation detection. (Atomindex citation 10:430169)

COO-3382-18 PC **A06**/MF **A01**
New York Univ. Medical Center, NY. Inst. of Environmental Medicine.
Radioactivity Studies Progress Report.
N. Cohen, and M. E. Wrenn. 30 Jun 79, 104p
Contract EY-76-S-02-3382

Separate abstracts were prepared for the 7 individual sections included in this progress report. (ERA citation 05:024755)

EFI-256(49)-77 PC **A02**/MF **A01**
Erevanskij Fizicheskij Inst. (USSR).
Absorption Coefficient Measurrement of Monochromatized Synchrotron Radiation at 0.65 - 1.3 A Interval for Some Biological Objects.
Ts. M. Avakian, I. P. Karabekov, and M. A. Martirossian. 1977, 8p
U.S. Sales Only.

The results of the measurement of absorption coefficients for some biological objects such as pea (Pisum sativum), wheat (Triticum aestivum), tobacco (Nicotiana tabacum- alpha) seeds, as well as the distilled water are presented. The measurement has been carried out on the Erevan Physical Institute Electron Accelerator synchrotron radiation beam. The good agreement of experimental and calculated data for water confirms the accuracy of the results related to other objects. (Atomindex citation 10:441137)

FRNC-TH-759 MF **A01**
Toulouse-3 Univ. (France).
Simulation of Energy Deposit Distribution in Water for 10 and 25 MeV Electron BEAMS.
M. de losA. Borrell Carbonell. 1977, 96p
In French.These (3e Cycle).
U.S. Sales Only. Microfiche copies only.

The Monte Carlo method was applied to transport simulation of electron beams from the exit window of a linear accelerator till the absorption by a water phantom. The distribution of energy deposit is calculated for ideal apparatus and experimental conditions. Calculations are made for a window-water surface distance of one meter, for 10 and 25 MeV monoenergetic incident electrons, and for different fields (15x15 cm exp 2 to 4x4 cm exp 2). Comparisons with experimental measurements obtained in comparable conditions with a Sagittaire accelerator (C.G.R.-MeV) show a good agreement concerning radial distribution and depth distribution around isodose 100%. However a certain disagreement appears in the end of depth penetration. (Atomindex citation 11:504223)

GSF-S-556 PC **A10**/MF **A01**
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H., Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz.
Determination of Conversion Factors Between Body Doses and Relevant Radiation Quantities for External X-Ray and gamma Irradiation.
R. Kramer. Feb 79, 203p
In German.
U.S. Sales Only.

With particular consideration of ICRP-26 conversion factors between body doses and relevant radiation quantities for external X- and gamma radiation were assessed. Determination of these conversion factors included all areas of professional, medical, and environmental exposures. There was used a mathematical exposure model being essentially defined by application of a Monte Carlo photon transport calculation in a mathematical human phantom. Body doses were estimated for a reference man in relation to the relevant raditon quantities for different angles of incidence as a function of photon energy. The effective whole body dose defining the risk assessment of stochastic radiation effects was evaluated for the first time. There was also calculated the equivalent dose index which, with respect to radiation protection, is of special importance among the quantities characterizing radiation. The calculations indicated that for different irradiation directions in the energy range between 0.025 and 10 MeV the equivalent dose index gives a conservative estimation for the effective whole body dose. For X-ray diagnostic examinations in the body area the tissue surface dose may be regarded as an upper limit for body doses in the useful beam. The standard energy dose and the equivalent dose index are a conservative measure for important body doses in case of terrestrial radiation and fresh fall-out radiation from the ground. (Atomindex citation 10:494477)

IAEA-R-1475-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Radiation Disinfestation of Local Sundried Fishery Products. Part of a Coordinated Programme on Radiation Preservation of Asian Fish and Fishery Products. Final Report for the Period 1 May 1974 - 30 April 1977.
I. S. Pablo. Jan 78, 27p
U.S. Sales Only.

The effect of gamma irradiation in controlling the flesh fly (Parasarcophaga rusicornis), the most predominating species of flies infesting fish during

sun drying, and the Dermestes carnivorous, the most prominant insect in dried fish during storage, was carried out. Naked flesh fly larvae irradiated with 50krad had a 100% mortality within a period of 12 days. This dose also prevented the larvae from developing into pupae. A complete destruction of the larvae can be obtained within 5-6 hours after exposure with an irradiation dose of 200krad. A dose of 30krad caused a 100% destruction on the eggs of the beetle. Using the same dose on the larvae, a dose of 225krad is sufficient to cause a 100% mortality right after irradiation. Pupae appeared to be more resistant to radiation than the egg. A 100% mortality was obtained at 40 and 30krads, 3 and 8 days after emergence, respectively. A dose of 250krad killed the adults immediately after radiation while 225krad gave a complete destruction one day after irradiation. The same effect of radiation was obtained on the naked and inoculated samples. Based on the organoleptic assessment, no significant difference was found between samples of unirradiated salted and dried striped mackerel and those irradiated with 225krad. (Atomindex citation 09:411208)

IAEA-R-1500-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Work within the Coordinated Programme on Radiosterilization of Medical and Biomedical Products. Final Report for the Period 1 July 1974–31 January 1978.
K. S. Rhee. Mar 78, 26p
U.S. Sales Only.

From surgical silk suture a radio-resistent microorganism was isolated and identified as Micrococcus roseus. It was not inactivated completely at radiation doses of 2.3 Mrad. The microorganisms originated from the raw materials of the surgical silk suture. The radiosensitivity of Micrococcus roseus in various environments was studied from 2.0 to 3.4 Mrad. The radioresistance was enhanced if the silk suture extract was used as a liquid media, indicating the presence of a radioprotective agent. The microorganism showed an increased radiosensitivity in oxygen bubbling conditions. Dextrose solution and physiological saline showed a decrease in pH and the presence of some unknown material. There indications, that the substances produced by radiolysis are different depending on the sterilization process applied. The antibiotic activities were stable for 10 Mrad at dry state. The activity was lost at low doses in liquid state except for neomycin which showed a tenfold increase in antibiotic activity. To evaluate the toxicity of irradiated transfusion sets a more detailed study is required. (Atomindex citation 10:437220)

IAEA-R-1566-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Disinfestation Studies on Dried Fish of Bangladesh. Part of a Coordinated Programme on Radiation Preservation of Asian Fish and Fishery Products. Final Report for the Period 15 December 1974 - 14 March 1978.
M. Ahmed. Jul 78, 11p
U.S. Sales Only.

A survey of major fish drying areas, storage facilities and dried fish markets in Bangladesh showed that blow fly, house fly and fruit flies are destructive insects infesting fish during the process of drying. Dermestes maculatus, Necrobia rupifes and earwigs were the most predominant insects infesting dried fish during storage. The effect of irradiation on different developmental stages of D. maculatus was investigated. Results on radiation disinfestation of D. maculatus, the most serious pest during storage, showed that a dose of 30 krad and above would be sufficient to control infestation of dried fish. No changes on organoleptic properties of dried mackerel irradiated with doses up to 400 krad could be detected. Polyethylene bags with a thickness of 0.075 mm and above appeared to be suitable for packaging of dried fish. (Atomindex citation 10:455198)

IAEA-R-1570-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Utilization of Ionizing Radiation for the Sterilization of Membraneous Connective Tissue Allografts. Part of a Coordinated Programme on Radiation Sterilization of Medical Products and Biological Tissues. Final Report for the Period 1 December 1974 - 31 January 1978.
N. Triantafyllou. May 78, 2p
U.S. Sales Only.

The work carried out, covered several aspects of radiation sterilization of membraneous allografts. In general the findings show that the sterilization of biological membranes with gamma irradiation using doses of up to 3 Mrads is a very satisfactory method for the sterilization of the material, since it does not seriously alter the biological properties of allografts. As for the changes of the mechanical properties, this is not considered to be a serious draw back, because the membraneous allografts cover surgical needs where the mechanical strength is not of paramount importance. (Atomindex citation 10:441303)

IEA-515 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Centro de Protecao Radiologica e Dosimetria.
Specific Absorbed Fractions for Photons Emitted in the Walls of the GI Tract.
S. F. Deus, V. Provenzano, and W. S. Snyder. Jul 78, 8p
U.S. Sales Only.

Although the sections of the gastrointestinal tract (GIT) are represented as source organs in MIRD Pamphlet No. 5, the wall and contents were not separated in the model. Thus, the absorbed fractions given in that publication are perhaps more representative of the contents than of the wall. A new model is given in ORNL-5000 where the contents and the wall are defined separately but only absorbed fractions (or specific absorbed fractions) are given for the source in the contents. Specific absorbed fractions for the source uniformly distributed in the wall of each of the three sections of the tract, namely, stomach, upper large intestine and lower large intestine are given. The same 12 energies are used for the sources as in the other publications and data are given for all target organs included previously. Each computer run used a sample of 60,000 photons and all calculations were done at the IEA at Sao Paulo, Brazil. When the statistics of the estimate are poor, a value obtained by use of Berger's build-up factor is substituted. Thus, a complete table of values is obtained. Activity in the walls of the tract has been reported for gallium and a check on the dose values reported by Cloutier et al. (MIRD73) reveals that the comulated activity (mu Ci-days) in the contents overwhelms those from the tract and the total dose from the tract and the total dose values are not greatly affected. However, differences of a factor of 2 or 3 are present when considering the contribution from activity in the walls alone. (Atomindex citation 10:441205)

IEA-517 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Centro de Processamento de Material Radioativo.
Preparation and Use of Lyophilized Kits: Human Serum Albumin Sup (99M)Tc and Derivatives.
S. C. M. Persano, J. Wagner, and C. P. G. da Silva. Oct 78, 25p
U.S. Sales Only.

The experimental data on preparation and conservation of human serum albumin (HSA) and its derivatives macro (MAA) and micro (MiAA) aggregates are presented. Lyophilized compounds are labelled with technetium 99m. Results from labelling reactions obtained by means of ascending paper chromatography and absorption spectroscopy are described. Results from electron and optical micrographs of MAA and MiAA, biological distribution and toxicity assay are also examined. Maps obtained from placentography, pulmonary and liver scintilography and cardiac blood pool studies are shown by 'Clinical Assay'. (Atomindex citation 11:496338)

INIS-mf-4010 PC **A10**/MF **A01**
Ceskoslovenska Komise pro Atomovou Energii, Prague.
Fifteenth International Meeting of the Society of Nuclear Medicine.
Sep 77, 206p CONF-7709125-(Sum.)
In Slovak.15. meeting of the Society of Nuclear Medicine, Groningen, Netherlands, 13 Sep 1977.

A separate abstract was prepared for each of the individual papers included. (ERA citation 04:030116)

INIS-mf-4142 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Tritium Turnover in Succulent Plants.
T. M. Krishnamoorthy, S. S. Gogate, and S. D. Soman. 1977, 6p
U.S. Sales Only.

Measurements of turnover rates for tissue free water tritium (TFWT) and tissue bound tritium (TBT) were carried out in three succulent plants, Opuntia sp., E. Trigona, and E. Mili using tritiated water as tracer. The estimated half-times were 52, 57.5 and 80 days for TFWT and 212, 318, and 132 days for TBT in the stems of the above plants respectively. Opuntia sp. showed significant incorporation of TBT, 10% of TFWT on weight basis, while the other two plants showed lesser incorporation, 2 to 3% of TFWT. However, the leaves of E. Mili indicated the same level of fixation of TBT as the stem of Opuntia sp. (Atomindex citation 09:376137)

INIS-mf-4157 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Bases for Protection Against Radiation and Conventional Hazards.
A. K. Ganguly. 1977, 18p CONF-7710161-1
Conference of Society of Nuclear Medicine, Trivandrum, India, 29 Oct 1977.
U.S. Sales Only.

The living and working environment of man is polluted by : (1) ionizing radiations, both natural and man-made, (2) man-made non-ionizing radiations e.g. microwaves, and (3) man-made chemicals. Many of these agents are carcinogenic and mutagenic. The basic radiation safety standards laid down by the ICRP have long-term objectives and take into account all aspects of radiation protection problem, but in the case of other agents the safety standards, whatever few are available, have short-term objectives and differ widely from country to country. If the paramountcy of man's health is accepted as the objective of all safety programs i.e. either for radiation hazards or conventional hazards, the above disparity must be removed. In order to achieve this goal, just as assessment of damage to organs and tissues of man is available in the case of ionizing radiations, similar assessment in the case of conventional hazards must be made available by collecting relevant data. (Atomindex citation 09:376123)

INIS-mf-4160 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Approach to Quantitate and Control the Mutagenic Hazards of Environmental Chemical and Radioactive Pollutants.
M. S. S. Murthy. 1977, 10p CONF-771182-1
Symposium on environmental pollution and toxicology, Hissar, India, 28 Nov 1977.
U.S. Sales Only.

Human populations, both at the occupational and non-occupational levels, are exposed to the environment polluted by man-made chemicals and radiation sources. The parameters required for quantitating mutagenic hazards of any agent are listed and it has been pointed out that though sufficient information of this nature is available in the case of radiations, it is almost impossible to collect similar information for chemical substances due to their number running into astronomical figures. A short-cut approach, therefore, is suggested to quantitate and control the mutagenic hazards of these pollutants. It is to express the mutagenic hazards of a chemical substance in terms of equivalent radiation units. The unit proposed for this purpose is called as Rem-Equivalent Chemical (REC). Total mutagenic burden to the society should take account of exposure from both chemicals and radiations. Advantages and limitation of this approach are discussed. (Atomindex citation 09:376125)

INIS-mf-4297 PC **A05**/MF **A01**
Universidade Federal do Janeiro (Brazil). Inst. de Biofisica.

Mathematical Model for Iodine Kinetics.
E. A. T. da Silva. 1976, 76p
In Portuguese.Thesis.
U.S. Sales Only.

A mathematical model for the iodine kinetics in thyroid is presented followed by its analytical solution. An electroanalogical model is also developed for a simplified stage and another is proposed for the main case. (Atomindex citation 09:386183)

INIS-mf-4503 PC **A05**/MF **A01**
Ministerstvo na Narodnoto Zdrave, Sofia (Bulgaria).
Anniversary Bulgarian--Solviet Medical Scientific Session. Abstracts.
Mar 77, 89p CONF-780373-(Absts.)
Anniversary Bulgarian-Soviet medical scientific session, Pleven, Bulgaria, 11 Mar 1978.
U.S. Sales Only.

Bases were developed for the conceptual design of a water basin to store 5000 MT of irradiated light water reactor fuel. The basin, wich could be operational by 1983, is designed to receive over 2000 MT per year of spent fuel and to provide interim storage of U.S. and some foreign fuel in support of U.S. policy of receiving and taking title to spent fuel rather than reprocessing this fuel. The bases for various design decisions are discussed. (Atomindex citation 09:419293)

INIS-mf-4650 PC **A04**/MF **A01**
Sovet Ehkonomicheskoj Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoj Ehnergii v Mirnykh Tselyakh.
Methodical Recommendations on Dosimetry of Radiation Processing Plants with Radioisotope gamma Sources.
1976, 72p
In Russian.
U.S. Sales Only.

Recommendations regarding methods are suggested for the dosimetry of radiation technological installations using gamma sources. Methods and means of dosimetric control to provide uniformity and maximum accuracy of measurements are described. Suggested are Types ofc dosimeters, amplitudes of doses of ionizing radiation measured, and values which characterize the accuracy of the measurements are suggested. Solid-body glass dosimeters for the measurement of the exposure dose; fluid ferrosulphate dosimeters, fluid chlorbensolethanol dosimeters, and gaseous dosimeters based on nitrogen monoxide to measure the absorbed dose; fluid sample dosimeters for asingle application to transfer the unit of the dose absorbed in water-equivalent systems; and color visual indicators are described.. Procedures for the calibration and maintenance of dosimeters for the determination of the absorbed dose and the dose rate of exp 60 Co and exp 137 Cs gamma radiation are also described. (Atomindex citation 10:426674)

INIS-mf-4679 PC **A02**/MF **A01**
Caldwell Connell Engineers, Melbourne (Australia).
Modelling Techniques for Predicting the Long Term Consequences of Radiation on Natural Aquatic Populations.
I. G. Wallis. Jan 78, 19p
U.S. Sales Only.

The purpose of this working paper is to describe modelling techniques for predicting the long term consequences of radiation on natural aquatic populations. Ideally, it would be possible to use aquatic population models: (1) to predict changes in the health and well-being of all aquatic populations as a result of changing the composition, amount and location of radionuclide discharges; (2) to compare the effects of steady, fluctuating and accidental releases of radionuclides; and (3) to evaluate the combined impact of the discharge of radionuclides and other wastes, and natural environmental stresses on aquatic populations. At the onset it should be stated that there is no existing model which can achieve this ideal performance. However, modelling skills and techniques are available to develop useful aquatic population models. This paper discusses the considerations involved in developing these models and briefly describes the various types of population models which have been developed to date. (Atomindex citation 10:430052)

INIS-mf-4681 PC **A02**/MF **A01**
South Australian Branch of the Australian Medical Association Inc., Adelaide.
Biological Effects of Radiation: Human Health and Safety.
May 77, 9p
U.S. Sales Only.

The biological hazards of nuclear energy usage are a growing source of public concern. The medical profession may well be expected to contribute to public debate on the issue. This document, therefore, attempts a balanced review of the known and suspected human biological consequences of exposure to different types of ionizing radiation, emphasizing in particular the nuclear industry. (Atomindex citation 10:430049)

INIS-mf-4692 PC **A03**/MF **A01**
Freie Univ. Berlin (Germany, F.R.). Klinikum Steglitz.
Animal Experiments on the Biokinetics of Sup(110M)Ag and Estimation of the Radiation Dose to Man.
J. Lente. 2 Sep 76, 39p
In German.Thesis.
U.S. Sales Only.

The author has investigated the biokinetics of Ag in animal experiments with rats and tries to transfer the findings to humans. The main finding of the investigation was that sup(110m)Ag is accumulated mainly in the liver and the lungs. The high accumulation in the intestine results from the biliary excretion of the radionuclide. This excretion path was studied by measuring the activity in the biliary secretion by fractionated collection after cholecystostomy. It was found that, as a result of the biliary excretion the relative activity in the small intestine increases with some delay and, after passing the small intestine, appears in the large intestine. Parallel to the biliary excretion, there is a continuous decrease in relative activity in the liver. As a measure for the accumulation of sup(110m)Ag, the relative concentration of the radionuclide in the organs was calculated. The dose values calculated on the basis of the distribution of sup(110m)Ag in the organs are between 7 mrd/ mu Ci for the large intestine and 0.3 mrd/ mu Ci for the testes. When the values obtained in animal experiments for the relative organ dose due to sup(110m)Ag are transferred to humans additional organ doses may be measured in case of application of sup(110m)Ag-contaminated sup(99m)Tc-eluates which may have a maximum relative activity of 0.4 mu Ci sup(110m)Ag/mCi sup(99m)Tc; these organ doses have a maximum value of 28 mu rd (large intestine) and a minimum value of 1 mu rd (testes). Related to the radiation exposure due to sup(99m)Tc, this means that there is no organ where the radiation exposure is increased by more than 0.2 exp 0 / sub 00 . (Atomindex citation 10:426351)

INIS-mf-4757 PC **A02**/MF **A01**
Order of 2 May 1977 on a Proficiency Certificate for Handling Industrial Radioscopy and Radiography Equipment.
1977, 2p
In French.
U.S. Sales Only.

This Order lays down that any person handling industrial radioscopy or radiography equipment must obtain a proficiency certificate delivered by a regional jury made up of the regional director for labour and manpower or his representative, a physician competent for industrial medicine and specialized in radiation protection, and an expert in industrial radiology. (Atomindex citation 10:446281)

INIS-mf-4798 PC **A02**/MF **A01**
NUCLEBRAS, Rio de Janeiro (Brazil). Diretoria de Tecnologia e Desenvolvimento.
Radiological Protection in Uranium Mines.
N. Figueiredo, I. M. Antunes, A. Moraes, T. M. Knoefel, and J. J. S. Estrada. 1976, 24p
In Portuguese.
U.S. Sales Only.

Radiological protection procedures designed to provide safety working in uranium mines are presented. (Atomindex citation 10:440963)

INIS-mf-4804 PC **A02**/MF **A01**
National Radiological Protection Board, Harwell (England).
Additional Information to Report NRPB-R--82, 'Annual Limits of Intake of Radionuclides for Workers'.
N. Adams, B. W. Hunt, and J. A. Reissland. Nov 78, 3p
U.S. Sales Only.

The values of effective dose (Hsub(E)), Annual Limits of Intake (ALI), derived air concentrations (DAC) and maximum achievable body burden (MABB) for Ra-226 given in R 82 are based on the assumption that 70% of Ra-222 produced in the body is exhaled. This percentage is appropriate only for bone since 100% of Ra-222 formed in soft tissue escapes. Taking this into account amended values of Hsub(E), ALI, DAC and MABB are given for Ra-226. Also, an error in the calculation of MABB for the alkaline earths had led to the wrong values being given in R 82. Amended values are given. (The values of effective doses, ALI and DAC are correct in R 82). (Atomindex citation 10:445045)

INIS-mf-4845 PC **A07**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Influence of Anoxia and Local Radiotherapy on Implantation Metastases.
Proefschrift (Dr.),
A. P. Varekamp. 6 Sep 78, 133p
In Dutch.
U.S. Sales Only.

The survival rate for carcinoma of the breast has hardly improved during the last decades, in spite of many attempts to attain better results by drastic changes in the methods of treatment. This is equally true of the frequent local recurrences in the former area of operation, often after a period of many years, when a complete cure has already been assumed by patient and doctor. This local recurrence is nearly always followed after a short period by the symptoms of a complete dissemination, which invariably leads to a lethal end. This thesis deals with the local recurrences. For that purpose a study has been made of the available literature, which has been described in the first part and a number of prophylactic measures has been mentioned in this same part. The influence of anoxia and radiotherapy on local recurrence is also discussed. For the time being, in preventing local recurrence of carcinoma of the breast, chemotherapy does not seem to be a substitute for the loco-regional directed surgery and radiotherapy, but does seem to be complementary. In local treatment, if longer survival is achieved by the use of chemotherapeutics, a longer period is available for the originating of a local recurrence. (Atomindex citation 10:445431)

INIS-mf-5117 PC **A04**/MF **A01**
Vrije Univ., Amsterdam (Netherlands).
Radiation Damage in DNA. Significance of Alkali-Labile Sites.
Proefschrift (Dr.),
V. Lafleur. 9 Nov 78, 75p
U.S. Sales Only.

A number of experiments are described with the purpose to obtain a better insight in the chemical nature and the biological significance of radiation-induced damage in DNA, with some emphasis on the significance of alkali-labile sites. It is shown that not only reactions of OH radicals but also of H radicals introduce breaks and other inactivating damage in single-standed phiX174 DNA. It is found that phosphate buffer is very suitable for the study of the reactions of H radicals with DNA, as the H sub 2 PO sub 4- ions convert the hydrated electrons into H radicals. The hydrated electron, which does react with DNA, does not cause a detectable inactivation. (Atomindex citation 10:469590)

INIS-mf-5135 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Delayed Effects of Ionizing Radiations.
J. Lafuma. 1977, 4p
In French.
U.S. Sales Only.

Maximum permissible irradiation values are determined by using human data and animal experi-

ments. These values must take into account risk and benefit and possible interaction with other carcinogenic factors. (Atomindex citation 10:469704)

INIS-mf-5147 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC.
X-Ray Interferometry: The Optical to gamma-Ray Connection.
R. D. Deslattes. 1978, 25p CONF-7806168-27
International workshop on neutron interferometry, Grenoble, France, 5 Jun 1978.
U.S. Sales Only.

In the recent past, it has been possible to complete an improved measurement chain connecting the hydrogen Rydberg with gamma -ray reference energies in the range $0.06 < E < 1.1$ MeV. Among other applications, these gamma -ray reference energies have been used to calibrate muonic X-ray spectra for tests of QED especially the vacuum polarization terms. Results of this improved calibration of the gamma -ray scale together with improved precision in the mesic X-ray to gamma -ray comparisons have resulted in the emergence of a pattern of substantial harmony between customary QED calculations and experiment. In a second application, the new gamma -ray values are used here as intermediate steps for the re-determination of several high Z X-ray lines where the X-ray to gamma -ray ratios have been previously established with high accuracies. In addition a smaller number of X-ray lines have already been directly determined. Taken together these results produce an interim set of re-evaluated X-ray lines having higher accuracies than were previously available. When these are compared with recently available Hartree-Fock-Slater calculations, a systematic pattern of significant disagreement is evident. (Atomindex citation 11:505508)

INIS-mf-5185 PC **A08**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Studies on the Role of RNA Tumour Viruses in Human Leukaemia.
K. Nooter. 21 Feb 79, 157p
Proefschrift (Dr.).
U.S. Sales Only.

A search has been made for an etiological role of retroviruses in human leukemia and cocultivation studies have led to the isolation of a presumed human type C virus which appeared to be oncogenic for experimental animals. The experimental procedures and results are fully discussed. The parallels between irradiation induced lymphomas in mice and leukaemias in man are explored. (Atomindex citation 10:476564)

INIS-mf-5193 PC **A03**/MF **A01**
Academia Brasileira de Ciencias, Rio de Janeiro.
New Trends in Photobiology.
48p CONF-730730-
Symposium on new trends in photobiology, Rio de Janeiro, Brazil, 15 Jul 1973.
U.S. Sales Only.

Studies concerning photochemistry and photobiology are presented. Special emphasys is given to photolysis, biological radiation effects, biological repair, etc. (Atomindex citation 10:476498)

INIS-mf-5205 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Mutation Breeding in Groundnut in Trombay.
S. H. Patil, and 1978, 8p
U.S. Sales Only.

Mutation breeding in groundnut was initiated with a view to develop improved cultures for increasing production in India, which contributes over 33 percent to the world groundnut production. More than 50 mutants were isolated-influencing almost all features of a groundnut plant. Cytological M sub 1 variants produced more mutants and in advanced generations. Some mutants showed interesting genetic behaviour, while others exhibited differential expression in different seasons leading to masking of mutant characters. In addition, mutants having economically useful characters, such as large kernel size and increased yielding potential were also isolated. Using these and other mutants new Trombay Groundnut (TG) varieties were developed which had large kernels suitable for export trade, improved oil content and increased yields. Among them TG-17 was unique for its extreme fastigiata character leading to flowering at all nodes and reduced number of vegetative branches. Demonstrations of TG-varieties for high yielding potential, on the fields of cultivators were successful. Because of increasing demand for the seed, a seed multiplication programme was initiated in 1974-1975 in collaboration with a private organisation. Starting with one ton seed more than 2000 tons of seed was produced till the end of 1977 and distributed for cultivation in the current year. (Atomindex citation 10:482129)

INIS-mf-5300 PC **A03**/MF **A01**
Bundesministerium des Innern, Bonn (Germany, F.R.).
Radiation Exposure from Outside in the Federal Republic of Germany Through Natural Radioactive Materials in the Open and in Houses. Taking the Influence of Building Materials into Account.
40p
In German.
U.S. Sales Only.

Assuming that the population on average spends upto 80% of the year in houses and upto 20% in the open, one obtains an average annual gonadal dose for the population through terrestrial radiation and building material radioactivity induced radiation of about 48 mrem. The true increase of the average annual gonadal dose due to staying indoors compared to that when permanently outdoors is about 10 mrem. The height of the annual gonadal dose due to terrestrial radiation outdoors shows district regional fluctuations. The values in the vicinity of populated areas and of those related to the continuous residence at the place concerned, lie between 3 mrem (Minimum value) and 253 mrem (maximum value). Assuming continuous residence outdoors, 1% of the population would be exposed annually to a gonadal dose of over 83 mrem due to terrestrial radiation. The height of the annual gonadal dose through terrestrial radiation including the radiation in buildings from the radioactivity of the building material also exhibits district regional fluctuations, and a multiple deviating distribution from the annual gonadal dose through terrestrial radiation outdoors. The values determined in buildings are between 9 mrem (minimum value) and 211 mrem (maximum value). Assuming continuous residence within the houses, 1% of the population would be exposed to a gonadal dose of more than 102 mrem per year due to terrestrial radiation including the radiation caused by the building material radioactivity. (Atomindex citation 10:491233)

INIS-mf-5314 MF **A01**
Oesterreichischer Verband fuer Strahlenschutz, Vienna.
Radiation Exposure of the Population and Its Comprehension.
1976, 264p CONF-7611122-
In German.Annual meeting of the Austrian Association for Radiation Protection, Vienna, Austria, 15 Nov 1976.
U.S. Sales Only. Microfiche copies only.

Separate abstracts were prepared for individual items. (Atomindex citation 10:490864)

INIS-mf-5399 PC **A07**/MF **A01**
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Maschinenbau.
Investigations for the Reduction of the Radiation Dose of Personnel Employed in Nuclear Power Plants.
N. Eickelpasch. 8 Feb 78, 136p
In German.Diss. (D.Eng.).
U.S. Sales Only.

It is demonstrated that the radiation dose of personnel employed in nuclear power plants is in general determined by radiation sources in the state of switched off plant. For the Grundremmingen nuclear power plant (KRB) it is shown by a quantitative Analysis with the radioisotope exp 60 Co as an example, that there are two main causes for the origin of the activated corrosion products: 1) activation of construction materials located in the irradiation zone of the reactor and a following output of these activation products into the circuit, 2) the intermediate deposition of inactive corrosion products of the system surfaces in the fission zone, activation of these particles and a following output into the circuit. A intermediale deposition time was determined to be 100 d. In the cited example is the source term given under 1) dominant after about two years of operation. By considering measurement in the KRB and Biblis A power plants the essential influential values on the intensity of the radiation sources are pointed out and possibilities for a reduction are derived. An analysis of the radiation dose of personnel in the same nuclear power plants points out practical ways of reducing personnel radiation doses by a given intensity of radiation sources. In the area of work organisations the monitoring and evaluation of person doses, based on the specific work, is demonstrated as an important support in reducing the radiation dose. (Atomindex citation 11:505352)

INIS-mf-5446 PC **A04**/MF **A01**
Technische Univ., Munich (Germany, F.R.). Fachbereich Medizin.
Early Damage in Tibia and Vertebrae of the Mouse after Incorporation of Ra exp 224 (Thorium X). AN Autoradiographic Investigation.
C. Zahn. 25 Nov 77, 52p
In German.Diss. (M.D.).
U.S. Sales Only.

We investigated the early cell damage of the osteogenous mesenchyma in the proximal tibia metaphysis as well as in the opening zone of the lumbar vertebra of female and male NMRI-mice after incorporation of RA 224. Two dose groups were applied which, in the long-term experiment, led to osteosarcomae in different frequencies. The mesenchymal cells, osteoblastomae, and endothelial cells per counting field were counted and the exp 3 H-thymidin-labelling index of the mesenchymal cells was determined after a single intraperitoneal injection of 25, resp. 75 mu C Ra 224/kg body weight. The incorporation of 25 mu C/kg causes in the tibiametaphysis and in the vertebra a decrease in the osteoblastomae and mesenchymal cells which is followed by a significant repopulation in the course of the second week after the start of the test. The cellular composition of the opening zone of the lumbar vertebra is, in this dose region, less influenced than the tibiametaphysis. The DNA-synthesis of the mesenchymal cells stops completely immediately after the incorporation. During the first three weeks, there is no essential difference between the two sexes. In the higher dose group (75 mu C/kg), the disturbance of the cell proliferation and the cell atrophy are quantitatively stronger and can be manifested over a longer period. There are no significant differences between tibiametaphysis and vertebra here. The results are discussed with regard to tumour formation. (Atomindex citation 11:505183)

INKA-Conf-78-100-000 PC **A12**/MF **A01**
Ulm Univ. (Germany, F.R.).
Biophysics Conference 1978. Programme and Abstracts.
1978, 251p CONF-7810183-(Absts.)
In German and English.Biophysics congress, Ulm, F.R. Germany, 1 Oct 1978.
U.S. Sales Only.

The main subject on the biophysics meeting was the biophysics of membranes with practical subjects from photosynthesis and the transfer processes on membranes. In radiation biophysics, problems of radiation sensitisation, immunological problems after radiation exposure, the oxygen effect and inhibitory processes in RNA synthesis after radiation exposure were discussed with a view to tumour therapy. (Atomindex citation 10:445042)

INP-913/B PC **A02**/MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Influence of Dose Rate on Dose - Effect Relationship in Dry Barley Seeds Irradiated with Fast Neutrons.
A. Cebulska-Wasilewska, J. Huczkowski, M. Litwiniszyn, A. Prochnicka, and B. Woch. Oct 76, 14p
U.S. Sales Only.

Dry seeds of barley (Hordeum vulgare "Aramir") were irradiated with cyclotron neutrons from exp 9 Be (d,n) exp 10 B reaction. Four neutron doses of six dose rates, ranging from 5 to 180 rads/min,

were used. Chamber tests on growth inhibition of seedlings and roots were performed. The mathematical analysis of effect - dose relation was executed for each dose rate. The results obtained indicate that there is an interrelation between biological effect and dose rate in dry seeds irradiated with cyclotron neutrons; plant damage decreases with the increasing dose rate. (Atomindex citation 10:426235)

INP-931/B PC **A02**/MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Application of Fast Neutrons in the Mutagenesis of Peas.
J. Huczkowski, and A. Kubajak. 1976, 25p
In Polish.
U.S. Sales Only.

Air dry seeds of two varieties of peas were irradiated with fast neutrons of average energy of 5,6 MeV obtained in the U-120 cyclotron at the Cracow Institute of Nuclear Physics. The doses varied from 60 to 1600 rads. It was found that even very low doses (less than 100 rads) cause a conspicuous delay of germination; a significant decrease of seedling height was only observed at doses higher than 200 rads. In the 170-620 rad range seedling height diminished lineraly with increase of dose. On the basis of the greenhouse experiment five doses were chosen for field experiments: 200, 300, 500, 800 and 1000 rads. It was found that a dose of about 500 rads was the maximum that could be applied for breeding purposes: the survival and fertility rate at that dose was about 40% of the control, doses of 800 to 900 rads caused full mortality. The M2 seeds were sown in the greenhouse and the frequency of chlorophyl mutations was examined in generation M2. It was found to be very high: for doses of 200 t0 300 rads the mutations ocurred in about 4% of M2 seedlings. (Atomindex citation 10:430174)

INS-TS-17 PC **A04**/MF **A01**
Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study.
Reports of Radiation Control Records and Research Activities, 6.
T. Nakamura, T. Kosako, and A. Maruhashi. May 78, 61p
In Japanese.
U.S. Sales Only.

The Radiation Control Center controls the radiation levels in and around the Institute to protect mankind from the radiation hazard. The center is also performing health physics and radiation shielding research. In this report, the records of environmental and personal monitoring of radiation exposure at the Institute are accumulated for the period during April 1976 - March 1978. This report includes the review of several research activities such as skyshine, residual radioactivity, radiation shielding and so on. (Atomindex citation 10:445327)

JINR-18-12286 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Investigation of Mineral Saturation of the Human Bone by the Negative Charged Muons Before and after Continuous Immobility.
V. S. Evseev, T. N. Mamedov, A. Minkova, V. S. Roganov, and B. M. Sabirov. 1979, 14p
In Russian.
U.S. Sales Only.

The analysis of elemental composition and mineral saturation changes in the human bone has been carried out for the first time in "vivo" with the "muonic X-ray spectroscopy techniques. Characteristical muonic X-ray ejected after muon stopping in a bone was detected by a Ge(Li) detector 55 cm exp 3 in volume. The experiment was performed with 18 investigated men-volunteers who enduced 180 day immobility state. The local engrossed dose in a heet bone during the 3 h exposition in the muonic beam constituted 0.2-0.3 mrem and the total irradiation by the diffused background was not more than 1 mrem. For the control group being not exposed to preventive measures, the change in the content of phosphorus and calcium was as much as twice, but in the qroups undergoing preventive measures (physical training, mioelectrostimulation, water-salt additions to the ration) changes are considerably less. The correlation between the changes in mineral saturation and its initial level has been registered. (Atomindex citation 10:494524)

KFK-EXT-20/78-1 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. Strahlenschutz und Sicherheit.
Radiation Protection Monitoring in the Decontamination Department. Annual Report 1977.
W. Neumann, and H. Dilger. Sep 78, 38p
In German.
U.S. Sales Only.

Rebuilding work in the plants of the Decontamination Department with ongoing waste handling and processing for the Karlsruhe Nuclear Research Center (KNRC) and the Karlsruhe Reprocessing Plant necessitated intensive radiation protection monitoring in 1977. Since 1975 the data collected with radiation protection control in this area have been compiled in special reports. These reports serve as a comprehensive documentation of the measured results in personnel dosimetry and in plant monitoring which during the rebuilding phase in the plant and to indicate the success of these efforts from the point of view of radiation protection. The documentation of radiation protection data constitutes a data base which allows quick assessment of the plant for purposes of radiation protection. While rebuilding of the liquid effluent decontamination plant (building 545) has shown the first positive effects on the doses received by the workers of the KNRC and the action staff since 1977, the limits set for the work without respiration equipment and for the contamination of floor and room air have not been reached in that plant. The considerable decrease of incorporations by the workers of the KNRC and the action staff is probably due to improved discipline in observing radiation protection measures. (orig.) 891 HP. (Atomindex citation 10:433965)

KFK-2652 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. Strahlenschutz und Sicherheit.
Calculated Radiological Impact on the Environment of the Karlsruhe Nuclear Research Center Due to the Emission of Radioactive Substances into the Atmosphere During the Years 1977 and 1978.
W. Huebschmann, D. Papadopoulos, and D. Nagel. Aug 78, 27p
In German.
U.S. Sales Only.

The radiological impact by radioactive offgas and exhaust air on the environment of the Karlsruhe Nuclear Research Center (KNRC) is calculated every year and compared to the permissible equivalent doses. This report includes both the actual doses in 1977 due to the activity released and the maximum doses to be reached in 1978 due to the scheduled activity releases from the KNRC and the nuclear power station Philippsburg I. The following doses are indicated (adults): whole body dose by external gamma -irradiation, by H-3 and C-14 inhalation and by C-14 and Sr-90 ingestion, skin dose by external beta -irradiation, lung dose by aerosol inhalation, bone dose by Pu inhalation and Sr-90 ingestion. The maximum infant thyroid dose due to iodine ingestion and for inhalation is also indicated. The respective maximum doses indicate that the dose limits will not be exceeded in 1978 provided the emissions remain below the scheduled maximum level. The doses in 1977 were markedly below these dose limits. The average whole body dose rate in 1977 of the population in a radius of 20 km around the KNRC was 0.15 mrem/a. (orig.) 891 HP. (Atomindex citation 10:430284)

KFK-tr-568 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Internationales Buero/Uebersetzergruppe.
Genetic Consequences of the exp 14 C-Decay.
L. M. Gracheva, and V. G. Korolev. Mar 78, 24p
In German.
U.S. Sales Only.

There are only few investigations on the biological and genetic consequences of exp 14 C decay especially due to the long half-life of exp 14 C. Naturally, the consequences of the decay of exp 14 C incorperated in DNA is of particular interest. Due to the thus occuring conversion into nitrogen, either opening of the ribose residue ring and base occurs or conversion into base analogue. The present work gives a survey on the investigational results on this topic which were obtained by various authors on phages, bacteria, algae and animal cells, as well as on molecular level. It was shown that the transmutation for the occurence of a lethal effect is many times more effective than beta -radiation. Investigations of the mutagenic effects and other genetic effects of the exp 14 C decay were carried out on micro-organisms, however also on higher forms of life, plants, insects and mice. An analysis of the mutations showed that transitions as well as transversions occur. As example for genetic effects of exp 14 C decay, the two following are named. In the case of mice which were exposed to exp 14 CO sub 2 atmosphere, it was seen that the number of polytloidal chromosome sets in the first spermatocytes increased considerably, an increase of the chromosome conversion rate was however not observed. When treating Gryllus larvae with exp 14 C, it was interesting to note that the crossing of exp 14 C-contained females with normal males produced viable eggs, whereas normal females after crossing with exp 14 C-contained males, laid no more eggs. (MG) 891 MG. (Atomindex citation 10:430101)

KURRI-TR-152 PC **A04**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Radiation Dose Model Calculations in Multi-Dimensional Media. Theoretical Calculation and Measurement of Radiation Fieldsr.
K. Katsurayama, and T. Tsujimoto. 1977, 56p
CONF-7608126-
In Japanese.Study meeting on radiation dose model calculations in multi-dimensional media, Kumatori, Osaka, Japan, 2 Aug 1976.
U.S. Sales Only.

Individual papers are abstracted separately. (Atomindex citation 09:410404)

KURRI-TR-153 PC **A04**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
High-Energy Radiation Effects on the Human Body.
K. Katsurayama, T. Tsujimoto, and K. Kato. 1977, 58p CONF-7611108-
In Japanese.Study meeting on high-energy radiation effects on the human body, Kumatori, Osaka, Japan, 24 Nov 1976.
U.S. Sales Only.

Separate abstracts were prepared for individual papers. (Atomindex citation 09:410473)

KURRI-TR-158 PC **A03**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Estimation of Absorbed Energy in Cell Nucleus for Neutron Capture Therapy.
T. Kobayashi, and K. Kanda. Aug 77, 30p
In Japanese.
U.S. Sales Only.

It is the basic principle of the neutron capture therapy that the charged particles of short range and high LET from the nuclear reactions (e.g. exp 10 B(n, alpha) exp 7 Li, exp 6 Li(n, alpha) exp 3 H, etc.) have a selective effect on only cancer cell which contains exp 10 B or exp 6 Li, while normal tissue without exp 10 B or exp 6 Li is not affected. This therapy has been already applied to some patients and a lot of experiments using animals have been performed. However, as to the condition of neutron irradiation such problems as neutron field and neutron collimation still have remained. For these problems, in order to obtain a fundamental data to decide the optimum irradiation condition, we estimate the absorbed energy in cell nucleus, which is deeply related to lethal dose for cell, with analytical calculation. For many cases, the calculation was performed with five parameters: radius of cell nucleus, particle range, particle energy loss, pattern, distribution of occurred particles and distance between two cell nuclei. A simple correlational figure was reduced, which easily indicates the estimation of the absorbed energy. As one of applications of the present calculation, the servival fraction of human tissue irradiated by neutrons is calculated in combining with one hit theory. (Atomindex citation 09:410997)

NKRZ-78-4 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow.
Mammary Glands Cancer as a Delayed Effect of Iodine 131 and Its Combination with gamma Radiation.
Yu. I. Moskalev, and S. V. Kalistratova. 1978, 10p
In Russian.
U.S. Sales Only.

The results of investigations using white rat females have shown that a small quantity of iodine 131, causing a thyroid dose of 50-1000 rad promotes mammary tumour development both under isolated and combined effect with X-ray radiation. It is suggested that this effect is due to stimulating action of small iodine-131 dose on thyroid, causing long-range increase in its physiological activity, hyperthyroidism state. Different results have been obtained in an experiment using a large iodine-131 quantity (4 mu ci), causing in thyroid a high dose (hundreds of krad) and resulting in thyroid destruction, development of hypo-and athyreosis. Dynamic observations have shown, that a high iodine-131 dose slows down the frequency and rate of development of mammary tumours in rats exposed to isolated or combined effect of iodine 131 and external gamma radiation of 300 rad. The data obtained testify, that the functional state of the thyroid effects considerably on natural and radiation-induced frequencies of mammary tumours in rat females. Increasing functional activity of thyroid promotes and decreasing slows down or prevents mammary tumour development. (Atomindex citation 11:496740)

NRPB-R-77 PC **A05**/MF **A01**
National Radiological Protection Board, Harwell (England).
Radiation Exposure of the UK Population.
F. E. Taylor, and G. A. M. Webb. Nov 78, 98p
U.S. Sales Only.

Man is continuously exposed to radiation from many sources, both natural and man-made. The man-made sources include medical irradiation, exposure from radioactive waste disposal, fallout from nuclear weapons tests and various 'miscellaneous sources' which include consumer products. The National Radiological Protection Board (NRPB) keeps these contributions to the radiation exposure of the population under continuous review and publishes reports on the subject periodically. This is the second such report and contains considerably more information than the first published in 1974. The balance of the report reflects the availability of data and the advice given in the sixth report of the Royal Commission on Environmental Pollution. The conclusions are: (a) that the major contribution to the dose to the population is from natural background radiation; (b) that the largest man-made contribution is from medical uses of radiation; (c) that the largest contribution from environmental contamination is still from the residual effects of fallout from nuclear weapons testing; (d) that occupational exposure and irradiation from miscellaneous sources, considered as contributions to the per caput dose to the population, are the next largest components; (e) that radioactive waste disposal is the smallest contributor to the per caput dose to the population. It was also felt useful to review the past trends in the doses resulting from the various sources and the authors have attempted to make some tentative predictions of doses up to the year 2000. (Atomindex citation 10:437594)

NRPB-R-79 PC **A02**/MF **A01**
National Radiological Protection Board, Harwell (England).
Assessment of the Mancuso Study.
J. A. Reissland. Sep 78, 8p
U.S. Sales Only.

Two papers (Mancuso, Stewart and Kneale, Health Physics; 33:369 (1977); and Kneale, Stewart and Mancuso, Reanalysis of the data relating to the Hanford study of the cancer risks of radiation workers, IAEA International Symposium on the Late Biological Effects of Ionizing Radiation, Vienna, March 1978) claim to demonstrate a significant excess of deaths among radiation workers at Hanford (USA) and attribute them to radiation-induced cancers. The work is important because it is essentially the only large scale study which has been reported of the effects of occupationally permitted levels of exposure to ionizing radiation. However, both papers have been widely critized on several substantial aspects. This report summarizes some of the major points from these criticisms. The overall assessment is a rejection of the validity of the majority of the claims from the study. Other analyses of the same data indicate reasons for the incorrect conclusions drawn by Mancuso, Stewart and Kneale. From these analyses it is concluded that the only excess fatal malignancies at Hanford that may be associated with radiation are cancer of the pancreas and multiple myeloma. Even for these, further investigation is necessary since no attempt has been made to eliminate the possibility of the effects being due to other carcinogens. (Atomindex citation 10:421125)

NRPB-R-82 PC **A03**/MF **A01**
National Radiological Protection Board, Harwell (UK).
Annual Limits of Intake of Radionuclides for Workers.
N. Adams, B. W. Hunt, and J. A. Reissland. Oct 78, 42p
U.S. Sales Only.

Annual Limits of Intake (ALI) of radionuclides have been calculated according to the recommendations of ICRP, based on limiting organ doses to avoid nonstochastic effects and to restrict stochastic effects. A procedure is described for the calculation of the integrated doses received by body organs following the inhalation or ingestion of a radionuclide. The procedure takes into account the contributions from the radioactive daughters and grand-daughters produced after intake and in principle may be extended to any number of generations of a decay chain. In practice, it is usually adequate to consider only the three most significant generations and to make simple approximations for the contributions from any others. Effective whole body absorbed doses for intakes of 1 becquerel of activity are given for 169 nuclides. The corresponding ALI, derived air concentrations and maximum achievable body burdens are also given. For some nuclides the intake limited by the risk of a non-stochastic effect in a specific organ is more restrictive than those based on stochastic effects. The values of these ALIs are given showing which organ is involved and also the value of the annual intake which would be determined by the risk of stochastic effects. (Atomindex citation 10:430084)

NRPB-R-85 PC **A03**/MF **A01**
National Radiological Protection Board, Harwell (England).
Radiological Testing of Consumer Products 1976-1978.
B. T. Wilkins, and D. W. Dixon. Feb 79, 26p
U.S. Sales Only.

The National Radiological Protection Board's source testing laboratory has been operational since 1976. In the intervening period the types of consumer product which have received most attention have been ionisation chamber smoke detectors and liquid crystal digital watches containing gaseous tritium light sources; the results obtained on these two types of device are the main subject of this report. The report also traces the development of the practical appraisal of these devices by the Board and describes the part played by the test results in the evolution of national and international standards. (Atomindex citation 10:494445)

PAT-APPL-6-126 108 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Absorbed Dose Water Calorimeter.
Patent Application,
Steve R. Domen. Filed 29 Feb 80, 22p PB80-208655
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to a device for determining radiation dose and, more particularly, to a standard dose measuring device against which other types of dosimeters may be calibrated.

PB80-199862 Not available NTIS
National Bureau of Standards, Washington, DC.
Dosimetry for the Commissioning of a Versatile Irradiation Plant.
Final rept.,
B. B. Radak, V. M. Markovic, and W. L. McLaughlin. 1979, 8p
Pub. in Trans. International Meeting in Radiation Processing, Radiation Physics and Chemistry (2nd), Miami, FL, November 16-19, 1978, Radiat. Phys. Chem. 14, p449-456 1979.

The chief objective of dosimetry for commissioning of a radiation plant is the comparison of the real, i.e., measured absorbed doses, with the ones expected from the calculations of the designer or producer of the plant. This mainly comprises the values of minimum and maximum absorbed dose in a typical box of products to be treated in the plant. With a little more effort, however, the complete set of relevant parameters for a suitable running of the plant can be obtained from the commissioning measurements. In the present work the results of such measurements obtained with the Irradiation Plant for Industrial Sterilization of Disposable Medical Supplies at the Boris Kidric Institute - Vinca (1) are present.

PB80-200512 Not available NTIS
National Bureau of Standards, Washington, DC.
Electron and Gamma-Ray Dosimetry Using Radiation-Induced Color Centers in LiF.
Final rept.,
W. L. McLaughlin, A. C. Lucas, B. M. Kapser, and A. Miller. 1979, 14p
Pub. in Radiat. Phys. Chem. 14, p467-480 1979.

Ionizing radiation produces relatively stable color centers in lithium fluoride. The values of the optical absorbance at the maxima of the resulting absorption bands are measured at the following wavelingths: lambda = 247 nm (F-centers); 443 nm (M-centers); 315 nm (R1-centers); 374 nm (R2-centers); 517 nm (N1-centers); 547 nm (N2-centers). It is shown that the response expressed in terms of optical absorbance as a function of absorbed dose in LiF is approximately the same for electron beams at very high absorbed dose rates and for gamma radiation at intermediate does rates. Commercially available cleaved LiF crystals, 6 mm x 2 mm in size and containing only very low amounts of impurities, proved to have satisfactory optical properties for high-level dosimetry applications. Commercially available LiF discs, 25 mm in diameter and 1.5 mm in thickness, supplied as vacuum-ultraviolet-transmitting window material, are also useful for dosimetry. Both types are of optical quality and may be reused by thermally bleaching the radiation-induced color centers.

PB80-202419 PC **A03**/MF **A01**
Howard Univ., Washington, DC. Dept. of Botany.
Genetic and Cellular Effects of Microwave Radiations.
Final rept. 8 May 75-31 Dec 79,
S. K. Dutta. May 80, 45p EPA-600/1-80-027
Grant EPA-R-803561

This research program was initiated with the overall objective of determining genetic and cellular effects from exposure of unicellular organisms to selected frequencies of CW and pulsed microwave radiation which is prevalent in the biosphere. Several tester strains of the bacterium Salmonella typimurium, TA-98, TA-100, TA-1535 and TA-1538; the bacterium Escherichia coli, W3110 (pol A) and p3438 (pol A-, repair deficient); and the yeast Saccharomyces cerevisiae, D3, D4 and D5 were tested for lethal and mutagenic events. Effects of known elevated temperatures were studied to distinguish microwave induced temperature effects from the direct temperature effects. Three kinds of microwave exposure systems were used in these studies: (1) farfield antenna (for 2.45 GHz and 8.5 - 9.5 GHz), (2) waveguide (for 8-10 GHz) and (3) TEM (transverse electric and magnetic mode) transmission lines for 915 MHz radiation. The SAR (specific absorption rate) for various exposures ranged from 0.1 W/kg to 40 W/kg. Pulse repetition rates were 400 Hz and 1000 Hz for pulsed microwave radiations. The studies revealed no increase in mutations or of gene conversions when cells were exposed to microwave radiations, but yeast and bacterial strains showed cellular lethality caused by temperature rises (greater than 10C) at higher power levels.

PB80-203599 PC **A06**/MF **A01**
Southwest Research Inst., San Antonio, TX.

Radon Daughter Dosimeter Tests in Active Uranium Mines.
Final rept. 2 Oct 78-15 Feb 80,
William D. Dodge, and Van B. Parr. May 80, 112p
BUMINES-OFR-71-80
Contract H0282031

Six underground tests were conducted to evaluate the performance and determine the reliability of three different types of personal radon daughter dosimeter systems in active uranium mine usage. Mean-time-between-failures estimates from 194.4 to 276.2 hours were obtained, and advantages and disadvantages of each system are identified. Test results suggest one system is marginally acceptable for large-scale uranium mining usage. Recommendations are presented for improving the existing systems and for developing new and more satisfactory versions.

PB80-204597 PC **A02**/MF **A01**
Bureau of Radiological Health, Rockville, MD. Div. of Compliance.
Guide for the Filing of Annual Reports for X-Ray Components and Systems.
Annual rept. 1 Jul 80-30 Jun 81.
Jul 80, 9p DHHS/PUB/FDA-80-8123, FDA/BRH-80/103

The document will serve as a guide for all x-ray component manufacturers in complying with 21 CFR Subchapter J regarding Annual Reports and is applicable to every x-ray component manufacturer subject to the provisions of 21 CFR 1002.11.

PNCT-841-78-01 PC **A04**/MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
ACRO - A Computer Program for Calculating Organ Doses from Acute or Chronic Inhalation and Ingestion of Radionuclides.
A. Hirayama, Y. Kishimoto, and K. Shinohara. Jan 78, 67p
In Japanese.
U.S. Sales Only.

The computer program ACRO has been developed to calculate organ doses from acute or chronic inhalation and ingestion of radionuclides. The ICRP Task Group Lung Model (TGLM) was used for inhalation model, and a simple one-compartment model for ingestion. This program is written in FORTRAN IV, and can be executed with storage requirements of about 260 K bytes. (Atomindex citation 10:427565)

PNL-SA-7000 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Risks from Occupational Exposure to Ionizing Radiation.
E. S. Gilbert. 1979, 18p
Contract EY-76-C-06-1830

The assessment of health effects from occupational exposure to radiation presents a variety of problems resulting from the time dependent nature of the exposure data, the more favorable health frequently experienced by working populations, and limits imposed by the size of the populations and the magnitudes of the exposures received. A proportional hazards model is used to derive tests for determining if statistically significant effects are present and is also considered for point estimation. Because effects of the size expected from current estimates are unlikely to be detected in occupationally exposed groups, methods of calculating upper confidence limits are considered. Data from the Hanford plant are used to illustrate many of the problems and procedures. (ERA citation 05:004996)

RERF-TR-14-77 PC **A02**/MF **A01**
Radiation Effects Research Foundation, Nagasaki (Japan). Nagasaki Branch.
Incidence of Leukemia among Atomc Bomb Survivors in Relation to Neutron and gamma Dose, Hiroshmia and Nagasaki, 1950--71.
T. Ishimaru, M. Otake, and M. Ichimaru. Mar 78, 16p
Contract EX-76-C-28-3161
In Japanese and English.

The incidence of leukemia during 1950--71 in the fixed mortality sample of atomic bomb survivors in Hiroshima and Nagasaki has been analyzed as a function of individual gamma and neutron kerma and marrow dose. Two dose reponse models were tested for each of acute leukemia, chronic granulocytic leukemia, and all types of leukemia, respectively. Each model postulates that leukemia incidence depends upon the sum of the separate risks imposed by the gamma ray and neutron doses; in Model I both are assumed to be directly proportional to the respective doses, while Model II assumes that while the risk from neutrons is directly proportional to the dose, the risk from gamma rays is proportional to dose-squared. Weighted regression analyses were performed for each model. (ERA citation 04:052213)

SSI-1978-014 PC **A02**/MF **A01**
National Swedish Inst. for Building Research, Stockholm.
Increase of the Radiation Doses in Dwellings Caused by Reduced Ventilation Due to Energy Conservation Measures.
G. A. Swedjemark. Jul 78, 22p
In Swedish.
U.S. Sales Only.

The reduced ventilation will lead to increased radon concentrations, specially in houses were shale-based concrete has been used as construction material. The increase of the radiation doses is calculated for some different energy conservation programs. (Atomindex citation 10:430407)

SSI-1978-022 PC **A02**/MF **A01**
National Swedish Inst. for Building Research, Stockholm.
Radon Concentration and gamma Radiation in One-Family Houses Built with Unusually Large Quantities of Shale-Based Porous Concrete.
G. A. Swedjemark, and B. Haakansson. Jun 78, 7p
In Swedish.
U.S. Sales Only.

Four two storeyed one family houses containing shalebased concrete in walls and frameworks have been examined. The gamma radiation dose and the concentration of radon and its daughters were measured. Radiation doses were estimated to be between 230 and 330 mrad/year for people living in these houses. (Atomindex citation 10:430408)

SSI-1978-025 PC **A02**/MF **A01**
Statens Straalskyddsinstitut, Stockholm (Sweden).
Radiological Impacts of Uranium Mill Tailings - a Review with Special Emphasis on the Tailings at Ranstad in Sweden.
J. O. Snihs, and P. O. Agnedal. Jul 78, 7p
U.S. Sales Only.

The environmental impact of uranium mill tailings can be expressed in collective dose commitment and corresponding detriment per MWsub(e).Y energy produced by the uranium which corresponds to the amount of waste of interest. The methods of dose commitment calculations are discussed and it is suggested for the purpose of estimation of the detriment to limit the commitment to 10,000 years. The external radiation from the tailings is easily reduced by covering but in case of a future settlement on the tailings the collective dose commitment will be some hundreds to thousands of manrad/MWsub(e).Y depending on the quality of the uranium ore. The dispersion of dust from uncovered tailings is mainly a local problem and the collective dose commitment for critical tissues in the lung will be less than a manrad/MWsub(e).Y. In the long run the cover may be lost and the resultant collective dose commitment for the critical tissues in the lung will be a few tens of manrad/MWsub(e).Y depending on the quality of the tailings. The effects of global dispersion of the material in the tailings are also discussed. (Atomindex citation 10:429946)

STUDSVIK-78/4 PC **A02**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Central Dose Register for the Nuclear Industry in Sweden.
C. O. Widell. Jun 78, 8p
U.S. Sales Only.

The central dose register for the nuclear industry in Sweden has been in operation since 1974. The system contains today about 18 000 persons in the register. The dose information is stored on discs on a CDC Cyber 172 computer and all information to and from the system is handled by terminals at the different nuclear sites. The terminals are connected to the computer by normal telephone lines. Most doses are recorded on TLD. The data from the TLD readers is automatically transferred to the computer via punched tape and the local computer terminal. The dose results are stored under the person's unique social security number. It is also possible to use social security number systems of other countries. The dose register system also supervises the condition of the readers and their calibration by circulation dosimeters which have been given a reference dose. The information from the system can be obtained on many different types of lists, for example, annual, quarterly, monthly, departementally, personal history, job number. (Atomindex citation 10:491264)

TNO-MBL-1977-8 PC **A02**/MF **A01**
Gezondheidsorganisatie TNO, Rijswijk (Netherlands). Medisch Biologisch Lab.
Chemical Protection Against Ionizing Radiation: A Survey of Possible Mechanisms.
J. J. van Hemmen. Dec 77, 23p
In Dutch.
U.S. Sales Only.

A comparative survey is given of the hypotheses which have been proposed to explain the protecting and sensitizing action of chemical substances towards ionizing radiations such as gamma radiation or x radiation. (Atomindex citation 09:401567)

UCRL-15121 PC **A04**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Relative Potential Hazards of Radioactive Waste in Various Water Systems.
J. J. Duffy, and G. L. Mealy. 15 Jun 79, 74p
Contract W-7405-ENG-48

The potential hazard to man arising from the hypothetical release of radioactive spent fuel waste into various water systems has been evaluated. Radionuclide transport and human exposure were simulated for six water systems: a large Northwestern river, a small Northeastern river, a small Northwestern river, a large Central Region river, a lake with no outflow in an arid region, and an aquifer discharging directly into an ocean. (ERA citation 05:008179)

UCRL-83328 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Radiation Safety and Health Effects Related to Low-Level Radioactive Wastes.
W. C. King. 17 Sep 79, 22p CONF-7710224-1
Contract W-7405-ENG-48
Western occupational health conference, Monterey, CA, USA, 11 Oct 1977.

The hazards associated with low-level radioactive waste, one of the nation's greatest concerns, are discussed from a health physicist's perspective. Potential biological hazards, four stages of the low-level radioactive waste disposal process, and suggested methods of reducing the risks of handling and disposal, based on previous studies, are defined. Also discussed are potential pathways of human exposure and two scenarios designed to demonstrate the complexity of modeling exposure pathways. The risks of developing a fatal cancer from exposure to the radioactive material, should it occur, is compared to other more commonly accepted risks. (ERA citation 05:006241)

UCRL-83548 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
In Vivo Measurement of Actinides in the Human Lung.
A. L. Anderson, G. W. Campbell, and R. V. Griffith. 6 Nov 79, 25p
Contract W-7405-ENG-48

The problems associated with the in vivo detection and measurement of actinides in the human lung are discussed together with various measurement systems currently in use. In particular, the methods and calibration procedures employed at the Law-

rence Livermore Laboratory, namely, the use of twin Phoswich detectors and a new, more realistic, tissue-equivalent phantom, are described. Methods for the measurement of chest-wall thickness, fat content, and normal human background counts are also discussed. Detection-efficiency values and minimum detectable activity estimates are given for three common actinides, exp 238 Pu, exp 239 Pu, and exp 241 Am. (ERA citation 05:006242)

UR-3490/LCP-18 PC **A08**/MF **A01**
Rochester Univ., NY. Dept. of Radiation Biology and Biophysics.
ESR-ENDOR Study of X-Irradiated Single Crystals of alpha -D-Glucopyranose and alpha -Methyl-D-Glucopyranoside; Environmental Effects Upon Radiation and Free Radical Chemistry in Carbohydrate Model Systems.
K. P. Madden. 1979, 173p
Contract EY-76-C-02-3490
Thesis.

Single crystals of x-irradiated alpha -D-glucopyranose (alpha Glu) and alpha -methyl-D-glucopyranoside (alpha MeGlu) were studied to determine products and reaction mechanisms in carbohydrate radiation and free-radical chemistry. Four free-radical products were identified in alpha MeGlu single crystals at 77K; a reoriented 06 primary alkoxy radical (06RPA), an 02 secondary alkoxy radical (02SA), a deprotonated C6 primary hydroxyalkyl radical (C6DPH), and a C5 secondary oxyalkyl radical (C5S0). Irradiation and observation at 12K produced an unreoriented 06 primary alkoxy radical (06PA). Four free radicals were identified in alpha Glu single crystals at 12K and 77K; two different 02 secondary alkoxy radicals (02SA and 02SA'), a C6 primary hydroxyalkyl radical (C6PH), and a C3 secondary hydroxyalkyl radical (C3SH). Study of the free radical environment about 06 in alpha Glu and alpha MeGlu indicated that the 06-H(06) bond in alpha MeGlu has considerably more ionic character than its counterpart in alpha Glu. The presence of an additional hydrogen bond to 06 in alpha MeGlu was used to explain the reorientation of the 06PA radical, and the stability of this species in the alpha MeGlu host crystal. Free radical reactions in alpha Glu and alpha MeGlu were induced by slowly warming crystals irradiated at 77K until conversion occurred. In alpha MeGlu, the major reaction sequence was C6DPH implies C550 implies C2 primary hydroxyalkyl radical (C2PH) implies room temperature allylic radical. In alpha MeGlu, the major pathway is C6PH implies C2PH implies C2 secondary hydroxylkyl radical (C2SH). Environmental influences upon these free-radical reaction mechanisms are discussed. The results from previous work on irradiated aqueous glasses of alpha Glu are briefly reviewed, and compared to those obtained from the single crystal system. (ERA citation 05:009319)

UR-3490/LCP-19 PC **A14**/MF **A01**
Rochester Univ., NY. Dept. of Radiation Biology and Biophysics.
Characterization of an MMS Sensitive Mutant of Saccharomyces Cerevisiae.
P. S. Martin. 1979, 318p
Contract EY-76-C-02-3490
Thesis.

We have characterized a methyl methanesulfonate sensitive mutant of the yeast Saccharomyces cerevisiae in order to learn more about DNA repair and mutagenesis in this organism. The mutation, designated mms3-1, also confers sensitivity to ultraviolet light and to ethyl methanesulfonate in both haploids and homozygous diploids. Its effect on gamma -ray sensitivity, however, is a function of the ploidy of the cell and its effect on induced mutation is a function of both the ploidy of the cell and the nature of the inducing agent. Our major findings are discussed. Our data indicate that: (1) Saccharomyces cerevisiae has an error prone pathway for the repair of uv damage controlled by the MMS3 gene product operating in and only in, and possibly induced by conditions present only in, a/ alpha diploids; (2) in diploids, at least, there exists at least one step in the error prone repair of uv induced damage which is different from a step in the error prone repair of EMS induced damage; (3) a/ alpha mms3-1/mms3-1 diploids may be defective in a step common to the repair of mutagenic lesions following uv irradiation and lethal lesions following gamma irradiation; and (4) there are steps in the repair of MMS induced lethal damage that are different from steps in the repair of EMS induced lethal damage. (ERA citation 05:009323)

6S. Stress Physiology

AD-A086 318/3 PC **A02**/MF **A01**
Navy Experimental Diving Unit Panama City FL
Is the Weight Loss of Hyperbaric Habitation a Disorder of Osmoregulation.
Final rept.,
Lawrence W. Raymond, Nancy S. Raymond, Victor P. Frattali, Jonas Sode, and Carolyn S. Leach. 1980, 9p Rept no. NEDU-7-80
Pub. in Aviation, Space and Environmental Medicine, v51 n4 p397-401 Apr 80.

No abstract available.

AD-A086 423/1 PC **A09**/MF **A01**
Undersea Medical Society Inc Bethesda MD
Decompression Theory.
Thomas E. Berhage. 25 Jun 80, 187p Rept no. UMS-PUB-29WS(DT)
Contract N00014-74-C-0319
Proceedings of the Undersea Medical Society Workshop (17th) Held at Bethesda, MD on 6-7 Sep 78.

The initial letter that went out to Workshop participants outlined the background that led to the formulation of the workshop topic. It stated 'The median depth of diving in the U.S. Navy is only about 34 fsw. Because the great majority of fleet diving is only to shallow depths, the U.S. Navy has not yet really confronted the true magnitude of the decompression problem. There is every indication that if the U.S. Navy were to suddenly desire to start diving deeper, there would be a tremendous increase in the incidence of decompression sickness. The evidence to support this contention can be found in the fact that the U.S. Navy has never been able to conduct a 'bends'-free deep saturation dive; the project to develop deep subsaturation decompression procedures for the MK 1 Deep Dive System was abandoned due to severe decompression sickness; the diver training program has its highest incidence of decompression sickness on its deep air narcosis demonstration chamber dive; and finally, the U.S. Navy Safety Center statistics show an inordinately high incidence of decompression sickness on dives deeper that 100 fsw. The first section of the report presents a brief history of the development of the U.S. Navy's version of the Haldane model, along with a description of some of the diving environments in which the model has not worked. The second section deals with the 12 neo-Haldanian assumptions and presents the best current thinking with regard to their viability; it also serves to meet the objectives of the Workshop. The third section of the report contains the individual manuscripts presented by the Workshop attendees.

AD-A086 424/9 PC **A04**/MF **A01**
Undersea Medical Society Inc Bethesda MD
Techniques for Diving Deeper Than 1,500 Feet,
E. B. Smith. Mar 80, 67p Rept no. UMS-PUB-40WS(DD)
Grant N00014-80-G-0009
Proceedings of Undersea Medical Society Workshop (23rd) Held at Wilmington, NC 19-21 Mar 80.

This workshop consisted of five sessions: Operational problems; High Pressure Neurological Syndrome (HPNS) in man; HPNS: mechanisms and potential methods of amelioration; Additional environmental limits; Clarification of future strategy. It was initialed as a sequel and an update of a previous workshop entitled 'Strategy for future diving to depths greater than 1000 feet.' It is apparent that there is a continuing need for free divers operating at depth, particularly in the acquisition of undersea energy sources. A recent development that increases the capability of the diver at depth is the addition of nitrogen to the helium-oxygen breathing mixture. It must be stated, however, that the underlying mechanisms which govern the effects of high pressures and dissolved gases are not yet well understood, and a considerable research effort must be made in order to place deep diving on a more secure basis. (Author)

AD-A086 474/4 Not available NTIS
Illinois Univ At Urbana-Champaign Dept of Physiology and Biophysics
Mild Cold Exposure Increases Survival in Rats with Medial Preoptic Lesions,
Jennifer A. Nagel, and Evelyn Satinoff. 26 Dec 79, 4p
Availability: Pub. in Science, v208 p301-303, 18 Apr 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 478/5 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Physiological Effects of Cold Air Inhalation during Exercise,
G. Harley Hartung, Loren G. Myhre, and Sarah A. Nunneley. 1980, 6p Rept no. SAM-TR-79-466
Pub. in Aviation, Space and Environmental Medicine, v51 n6 p591-594 Jun 80.

No abstract available.

AD-A086 483/5 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
Phasic Changes in Bone CO2 Fractions, Calcium, and Phosphorus during Chronic Hypercapnia,
Karl E. Schaefer, Stephen Pasquale, Arthur A. Messier, and Michael Shea. 16 Apr 79, 13p Rept no. NSMRL-858
Pub. in Jnl. of Applied Physiology, v48 n5 p802-811 1980.

No abstract available.

AD-A086 532/9 PC **A02**/MF **A01**
Webb Associates Inc Yellow Springs OH
Body Heat Loss in Diving.
Final rept. 1 Aug 71-31 Dec 79,
Paul Webb. 1980, 15p
Contract N00014-72-C-0057

This report first summarizes seven sets of experiments in cold exposure, then indicates the nature of the model which unifies the data obtained. It describes a secondary interest in the weight loss of hyperbaric environments, and it lists additional activities undertaken. A list of publications which have resulted during the course of this contract concludes the report.

AD-A086 646/7 PC **A02**/MF **A01**
Cincinnati Univ OH Dept of Engineering Science
Comprehensive, Three-Dimensional Head-Neck Model for Impact and High-Acceleration Studies,
Ronald L. Huston, Jeffrey C. Huston, and Mark W. Harlow. 1977, 8p
Contract N00014-76-C-0139, Grant NSF-ENG75-21037
Pub. in Aviation, Space, and Environmental Medicine, v49 n1 p205-210 Jan 78.

No abstract available.

AD-A086 647/5 PC **A02**/MF **A01**
Cincinnati Univ OH Dept of Engineering Science
Biodynamic Model of a Paracnutist,
Ronald L. Huston, James M. Winget, and Mark W. Harlow. 1977, 7p
Contract N00014-76-C-0139
Pub. in Aviation, Space, and Environmental Medicine, v49 n1 p178-182 Jan 78.

No abstract available.

AD-A086 749/9 PC **A07**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Canadian Diving Symposium (4th) Held at the Defence and Civil Institute of Environmental Medicine, Toronto, Ontario, 24-25 October, 1979.
Feb 80, 127p Rept no. DCIEM-80-R-11
See also report dated 31 Oct 78, AD-A065 158.

The topics of this symposium are listed as follow: Phase I XDC-2 Validation Dives 0-54 msw; An Overview of DCIEM Research and Development in Support of Canadian Diving Operations; Time Lapse Photography as an Adjunct to Diver and Underwater Vehicle Observations; Report on Canadi-

an Underwater Industry; In situ structural Repairs to Ships in the High Arctic; Outlook for Oil and Gas in Canada's Offshore Frontiers; Canada's Energy Resources; Technical Aspects Involved in a Year Round Study of Kelp Growth and Physiology in the Canadian High Arctic; Man Underwater, Medicine and Miracles - II; Occupational Centre for Occupational Health and Safety; DCIEM Diving Programme; Diving Incidents - Tobermory; A Review of the Uses and Developments in Remotely Operated Underwater Work Vehicles; U.S.N. Changeover Mk V to Mk XII; C.U.T.C. Training.

N80-27982/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Central Neurotropic Substances on the Hypophysisadrenal Cortex System During Immobilization of Animals.
V. Y. Ryzhenkov. May 80, 9p NASA-TM-76158
Contract NASW-3199
Transl. Into English from Farmakol. Toksikol. (USSR), V. 31, No. 5, 1968 p 545-548. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The immobilization of guinea pigs for 5, 12, 24 and 48 hours, by securing to a slab, results in a persistent rise of the blood plasma 17-oxycorticosteroid concentration. Repeated administration of phenobarbital (50 mg/kg) and of the sodium salt of gamma-oxybutyric acid (500 mg/kg), as well as the combined administration of central m- and n-cholinolytics with small doses of phenobarbital tends to inhibit activation of the adrenal cortex during 48 hour immobilization of the animals. Repeated administration of aminazine (20 mg/kg) tends to decrease activation of the adrenal cortex. The administration of reserpine (0.1-5 mg/kg) 12-18 hours before immobilization of guinea pigs increases the response of the hypophysis-adrenal cortex system.

N80-27983/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Oxygen Consumption of Animals under Conditions of Hypokinesia.
Y. N. Loginova, A. I. Volozhin, I. G. Krasnyku, and Y. A. Stroganova. May 80, 11p NASA-TM-76167
Contract NASW-3198
Transl. Into English from Patrol. Fiziol. Eksp. Ter. (USSR), No. 4, Jul.-Aug. 1975 p 32-36. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prepared by Med. Stomatological Inst., Moscow.

The influence of hypokinesia on the oxygen consumption of rats, dog, and squirrels was investigated. Three periods of gaseous exchange were revealed in rats under conditions of a limited motor activity. During the first 10-15 days O2 consumption displayed a sharp elevation; on the 20th-30th day, it became stabilized at a higher level (in comparison with control) and it sharply rose again on the 40th-100th day. In dogs, hypokinesia produced a reduction of O2 consumption and then a tendency to its elevation was seen. A short period of physical exercises in squirrels after hypokinesia led to increased oxygen consumption at rest.

N80-27984/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Mechanisms of Water-Salt Metabolism Disturbances in Dogs Subjected to Six Month Hypokinesia.
V. I. Korolkov, Y. A. Kovalenko, V. P. Krotov, N. A. Ilyushko, and V. A. Kondratyeva. May 80, 9p NASA-TM-76170
Contract NASW-3198
Transl. Into English from Patol. Fiziol. Eksp. Ter. (USSR), No. 6, 1977 p 32-35. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Water-salt metabolism in dogs during prolonged restricted motor activity (hypokinesia) was investigated. It was found that hydration occurred and fluid was redistributed between the extra- and intra-cellular sectors. Also, electrolyte excretion rose, and magnetism and calcium metabolism changed significantly. It is concluded that the forces caused by muscle strain proper (which was decreased under conditions of hypokinesia) influence the state of bone metabolism.

N80-27987/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Immobilization on the EEG of the Baboon. Comparison with Telemetry Results from Unrestricted Animals.
J. Bert, and H. Collomb. Apr 80, 5p NASA-TM-76137
Transl. Into English from Compt. Rend. Soc. Biol. (France) V. 159, No. 5, 1965 p 1202-1204. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

he EEG of the baboon was studied under two very different sets of conditions: 37 were totally immobolized while 12 were studied in their free movements with 4 channel telemetry. For the immobilzed, 3 stages were described: (1) activation, record desynchronized; (2) rest with 13-15 cm/sec rhythm, like the human alpha rhythm stage but with eyes open or closed; (3)relaxation with a decrease in 13-15 rhythm and the appearance of 5-7 cm/sec theta waves, eyelids closed, animal apparently sleeping. For the free animals the rest stage appeared when the animal's attention was not directed anywhere and there was no relaxation stage. It is concluded that the EEG pattern of the immobilized animal that was described as the 'relaxation' stage really represents a special functional state which one must distinguish clearly from the physiological stages of sleep.

N80-27988/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Calorigenic Effect of Adrenaline in Rats under Conditions of Restricted Motor Activity.
L. Tomaszewska, H. Kaciuba-uscilko, and S. Kozlowski. Jun 80, 8p NASA-TM-76192
Contract NASW-3198
Transl. Into English from Artif. Satell. (Poland), 1/2, 1973 p 75-80. Translation Was Announced as A74-20558. Transl. By Scientific Translation Service, Santa Barbara, Calif. Presented at Symp. On Cosmic Biol. And Med., Warsaw, 12-17 Jun. 1972.

In previous studies, it was demonstrated that long term restricted motor activity in rats induces a decrease in body weight, an increase in release of adrenaline, and a decrease in the release of noradrenaline with the urine, as well as a reduction in activity of the thymus gland and level of thyroxin in the blood. At the same time, a decrease was found in the internal body temperature that was accompanied by an increase in the rate of metabolism in the state of rest. An investigation is presented which attempts to clarify whether the calorigenic effect of adrenaline under conditions of increased metabolism in the period of immobility is exposed to changes.

N80-27989/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Displacement of Plasma Protein and Conduction Velocity in Rats under Action of Acceleration Forces and Hypokinesia.
S. Baranski, Z. Edelwejn, and M. Wojtkowiak. Jun 80, 10p NASA-TM-76195
Transl. Into English from Postepy Astronautyki (Poland), V. 5, No. 2, 1972 p 61-70. Original Language Document Annouced as A73-17769. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Military Academy of Aviation Medicine, Warsaw.

The permeability of capillary vessels was investigated in order to determine if acceleration alone or following prolonged hypokinesia would induce changes in the vascular wall leading to the penetration by l-albumins and/or proteins with larger molecules. In rats undergoing action of +5 Gz accelerations, no increase in vascular permeability, as tested with the use of (Cr-5k)-globulin, was demostrated. In rats immobilized for 4 weeks before centrifugation, rather weak migration of (Cr-51)-globulin from the vessels was observed. Immobilization resulted also in lowering of conduction velocity in the sciatic nerve.

N80-27990/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Experimental Coronary Sclerosis Induced by Immobilization of Rabbits: A New Model of Arteriosclerosis.
V. V. Tyavokin, and W. W. Tjawokin. Jun 80, 19p NASA-TM-76196
Contract NASW-3198
Transl. Into English from Virchows Arch., a. (Germany, F. R.), V. 346, 1969 p 29-45. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

A new method for producing arteriosclerosis with coronary insufficiency in rabbits by means of immobilization is described and discussed. The experimentally induced atherosclerosis develops due to hypodynamics imposed by the reduced muscular activity without overloading with exogenous cholesterol. The atherosclerosis and coronary insufficiency are associated. With variations in the duration and extent of immobilization, coronary insufficiency alone or with atherosclerosis can be produced.

N80-27993/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effects of Immobilization on Spermiogenesis.
E. R. Meitner. 30 Jul 80, 14p NASA-TM-76282
Contract NASW-3199
Transl. Into English from Acta Anat. (Switzerland), No. 95, 1976 p 300-308. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Comenius Univ. Of Bratislava, Czechoslovakia.

The influence of immobilization stress on spermiogenesis in rats was investigated. After 96 hour immobilization, histological changes began to manifest themselves in the form of practically complete disappearance of cell population of the wall of seminiferous tubule as well as a markedly increased number of cells with pathologic mitoses. Enzymological investigations showed various changes of activity (of acid and alkaline phosphatase and nonspecific esterase) in the 24, 48, and 96 hour immobilization groups.

N80-28039/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Hypokinesia on Invertase Activity of the Mucosa of the Small Intestine.
A. Abdusattarov. Jun 80, 5p NASA-TM-76191
Transl. Into English from Uzb. Biol. Zh. (USSR), No. 1, 1978 p 61-62. Transl. By Kanner (Leo) Associates, Redwood City Calif. Original DOC. Prepared by Academy of Sciences (USSR).

The effect of prolonged hypokinesia on the enzyme activity of the middle portion of the small intestine was investigated. Eighty-four mongrel white male rats weighing 170-180 g were divided into two equal groups. The experimental group were maintained in single cages under 30 days of hypokinetic conditions and the control animals were maintained under ordinary laboratory conditions. It is concluded that rates of invertase formation and its inclusion in the composition if the cellular membrane, if judged by the enzyme activity studied in sections of the small intestine, are subject to phase changes in the course of prolonged hypokinesia.

N80-28040/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Morphofunctional Correlations in the Experimental Study of Myocardiopathies under the Stress of Forced Restraint. Note 2: The Influence of Adrenal Imbalance.
M. Dinu, S. Dolinescu, and A. Sneer. May 80, 12p NASA-TM-76138
Contract NASW-3199
Transl. Into English from Rev. Med.-Chir. (Iasi) (Romania), No. 1, 1978 p 87-91. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Orginal DOC. Prepared by Inst. Of Med. And Pharmacy.

Tests were performed with 70 rats to determine the effects of restraint on the functions and structure of the myocardium under varying conditions of adrenal inbalance. Results showed that in rats with adrenal imbalance, fasting and restraint produced the same biochemical alterations as in the controls. The morphologic alteractions, as well as their electric expression, were more varied and evident in the animals with adrenal imbalance. Persistence of the microscopic and electrocardiographic alterations after 72 hours restraint in the animals subjected to unilateral adrenalectomy suggests chronic evolution of the myocardial lesions. This proves

the necessity of intact adrenals for a good adaptability to stress.

N80-28041/5 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
Changes of the Body Functions During Long-Term Hypokinesia.
Y. A. Kovalenko, V. L. Popkov, Y. I. Kondratev, E. S. Mailyan, and Y. S. Galushko. May 80, 13p NASA-TM-76166
Contract NASW-3199
Transl. Into English from Patol. Fiziol. Eksp. Ter. (USSR), No. 6, 1970 p 3-9. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Prolonged hypokinesis (100-170 days) studied in 2000 rats kept in cages limiting their mobility provoked considerable changes in the gaseous and energetic metabolism: an elevation of the total gaseous metabolism and of the rate of O2 requirement by the muscles (in the late periods of hypokinesis) and a change in the intensity of tissue respiration of the liver and myocardium. There also proved to be a reduction in the level of phosphorylation and separation of oxidative phosphorylation in the myocardium, liver, and partially in the skeletal muscle. Prolonged hypokinesia led to changes in tissue metabolism: a disturbance of development of the animals, a marked delay and an increase in the weight of the organism and the muscular system, and disturbances of the mineral and protein metabolism. Prolonged hypokinesis also lead to exhaustion of the hypothalamus-hypophysis-adrenal cortex system.

N80-28042/3 PC A03/MF A01
National Aeronautics and Space Administration, Washington, DC.
The Relation Between Tilt Table and Acceleration-Tolerance and Their Dependence on Stature and Physical Fitness.
K. E. Klein, F. Backhausen, H. Bruner, J. Eichhorn, , and D. Jovy. Apr 80, 30p NASA-TM-75796
Contract NASW-3199
Transl. Into English from Intern. A. Angew. Physiol. (Germany, F. R.), V. 26, 1968 p 205-226. Original Language Document Announced as A69-21304. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

A group of 12 highly trained athletes and a group of 12untrained students were subjected to passive changes of position on a tilt table and positive accelerations in a centrifuge. During a 20 min tilt, including two additional respiratory maneuvers, the number of faints and average cardiovascular responses did not differ significantly between the groups. During linear increase of acceleration, the average blackout level was almost identical in both groups. Statistically significant coefficients of product-moment correlation for various relations were obtained. The coefficient of multiple determination computed for the dependence of acceleration tolerance on heart-eye distance and systolic blood pressure at rest allows the explanation of almost 50% of the variation of acceleration tolerance. The maximum oxygen uptake showed the expected significant correlation to the heart rate at rest, but not the acceleration tolerance, or to the cardiovascular responses to tilting.

N80-28044/9 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
The Content of Catecholamines in the Adrenal Glands and Sections of the Brain under Hypokinesia and Injection of Some Neurotropic Agents.
B. E. Melnik, and E. S. Paladiy. Mar 80, 10p NASA-TM-76010
Contract NASW-3199
Transl. Into English from Biol. Nauki (USSR), V. 15, No. 11, 1972 p 45-49. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By V. I. Lenin Kishinev State Univ. Ussr.

The dynamics of catecholamine content were studied in the adrenal glands and in various region of the brain of white rats under hypokinesia and injections of neurotropic agents. Profound changes in body catecholamine balance occured as a result of prolonged acute restriction of motor activity. Adrenalin retention increased and noradrenanalin retention decreased in the adrenal glands, hypothalamus, cerebral hemispheres, cerebellum and medulla oblongata. Observed alterations in catecholamine retention varied depending upon the type of neurotropic substance utilized. Mellipramine increased catecholamine retention in the tissues under observation while spasmolytin brought about an increase in adrenalin concentration in the adrenals and a decrease in the brain.

N80-28045/6 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
Mechanism of Selective Lesion of the Cardiovascular System in Psycho-Emotional Stress.
Y. M. Repin, and V. G. Startsev. Apr 79, 14p NASA-TM-76035
Contract NASW-3199
Transl. Into English from Vestn. Akad. Nauk Sssr (USSR), V. 8, 1975 p 71-76. Translation Was Announced as N76-12713. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By USSR Acad. Of Med. Sci. Inst. For Pathology and Therapy.

A species predisposition to hypertensive and ischemic heart disease occurs in mammals only at the level of primates, and is associated with social regulation of biological reactions. The specific physiological mechanism giving rise to psychonerogenic pathology may be an inhibition of the motor component of the agressive-defensive response. Repeated combination of pursuit with subsequenct immobilization resulted in four out of five experimental baboons developing serious arterial hypertension and ischemic lesion of the heart which lasted many years.

N80-28048/0 PC A03/MF A01
National Aeronautics and Space Administration, Washington, DC.
Cardiovascular and Respiratory Physiopathological Aspects of Hypokinesia.
A. Dagianti. Jun 80, 26p NASA-TM-76198
Contract NASW-3198
Transl. Into English from Recenti Progr. Med. (Italy), V. 52, No. 4, 1972 p 323-344. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The many effects of hypokinesia on the human organism are described. The differences in normally mobile subjects and hypokinetic subjects as relates to heart rate, average humeral pressure, cardiac capacity, cardia index, systolic range, and large cycle resistances are discussed. It is concluded that further studies must be carried out in seven specific areas of cariocirculatory damage due to hypokinesia.

6T. Toxicology

AD-A086 341/5 PC A13/MF A01
California Univ Irvine
Proceedings of the Conference on Environmental Toxicology (10th) Held in Dayton, Ohio on 13, 14, and 15 November 1979.
Apr 80, 292p AFAMRL-TR-79-121
Contract F33615-76-C-5005

Major technical areas discussed included environmental hazards of fibrous dusts, toxicokinetics of inhaled gases and vapors, and the environmental hazards of toxicants in surface water systems. The oncogenic effects of hydrazine in animal models and immunotoxic reactions as manifested by skin and lung hypersensitivity was presented. (Author)

AD-A086 362/1 MF A01
Oklahoma Univ Health Sciences Center Oklahoma City Dept of Physiology and Biophysics
Neurotoxic Properties on Endotoxins.
Final rept. 1 Aug 77-29 Feb 80,
Robert J. Person. 1 Jun 80, 18p Rept no. TR-1
Contract N00014-77-C-0630
Availability: Microfiche copies only.

Some endotoxins produce a biphasic effect on spontaneous transmitter secretion, with an early facilitation of release, but a monotonic depression of evoked release triggered by nerve stimulation, while lipopolysaccharide produces only a monotonic depression of both spontaneous and evoked transmitter secretion under physiological conditions. However, glycolipid produces a biphasic effect on both spontaneous and evoked release. This suggests that the variety of effects seen in less pure preparation of glycolipids are modulations of the biphasic pattern of action resulting from differences in extraction procedures, presence of polysaccharide, or contamination of the specific endotoxin preparation employed. Based on these experiments we have proposed experimentally based mechanisms for the action of bacterial glycolipid: (1) an early, transient ionophoric action for calcium which facilitates secretion and (2) a late increasing isolation of the membrane from extracellular space. (Author)

AD-A086 378/7 PC A02/MF A01
Army Environmental Hygiene Agency Aberdeen Proving Ground MD
Topical Hazard Evaluation Program of Candidate Insect Repellents AI3-36693a, AI3-36701a, and AI3-3674a, US Department of Agriculture Proprietary Compounds, October 1976 - April 1980.
Final rept.,
Allen W. Singer. 17 Jun 80, 7p USAEHA-75-51-0009-80, USAEHA-75-51-0011-80, USAEHA-75-51-0012-80

Preliminary hazard evaluations of AI3-36693a, AI3-36701a, and AI3-36746a were performed by means of laboratory animal studies using New Zealand White rabbits. The technical grade compounds caused moderate corneal and conjunctival injury in all animals, but no skin irritation. Based upon the ocular injuries, it was recommended that all three compounds not be approved for further testing as candidate insect repellents. If, however, any of these compounds provides a significant improvement of pest repellent properties over currently available compounds, it is suggested that they be purified through activated charcoal and resubmitted in their projected use formulation. (Author)

HRP-0030434/5 PC A02/MF A01
National Inst. for Occupational Safety and Health, Cincinnati, OH.
Recommended Standard for Occupational Exposure to Malathion.
Sep 78, 10p

Standards recommended by the National Institute for Occupational Safety and Health (NIOSH) concerning malathion exposure in the occupational setting are outlined. Malathion is a widely used insecticide, and NIOSH estimates that approximately 75,000 workers are potentially exposed to the chemical. The reason for a recommended environmental limit on exposure to malathion is to prevent medically significant inhibition of acetylcholinesterase and the irritation of exposed body surfaces. It is recommended that workers subject to occupational malathion exposure have preplacement medical examinations, with subsequent examinations when signs or symptoms of acute overexposure occur. It is also recommended that engineering controls be used when feasible to maintain malathion concentrations at or below the prescribed limit, and that respirators be used only in certain nonroutine or emergency situations. When skin exposure is prevented, exposure to malathion should be controlled so that employees are not exposed to the chemical at a time-weighted average concentration greater than 15 milligrams per cubic meter of air for up to 10-hour work shifts, in a 40-hour week. Medical surveillance, labeling and posting, personal protective equipment and clothing, education of employees about hazards of malathion, work practices, sanitation practices, and monitoring and recordkeeping requirements are considered in the NIOSH standards. A guide to respirator selection is presented in a table.

HRP-0902260/9 PC A04/MF A01
National Cancer Inst., Bethesda, MD. Office of Cancer Communications.
Cancer Information in the Workplace, Annotated Bibliography of Educational Materials for the Public and Health Professionals.
May 79, 61p DHEW/PUB/NIH-79-2001

Cancer Information in the Workplace is an annotated compilation of citations to materials available for use in public, worker, and professional education programs. The bibliography is intended to assist health educators, industrial hygienists, and health care providers in identifying and selecting appropriate educational materials. The criteria for selection were availability and currency; items produced before 1970 were not considered timely. Journal articles were included only if they were educational in nature. The term 'Audiovisual Materials' refers to nonprint materials such as slide-tape programs, films, and videocassettes. To obtain items please contact the source indicated. These materials are not available from the Clearinghouse. The materials listed represent a variety of information on occupational carcinogens, as well as on agencies and data bases dealing with the topic. Their inclusion does not imply endorsement by the National Cancer Institute. Users may wish to preview specific items before including them in an educational program.

HRP-0902261/7 PC **A05**/MF **A01**
National Cancer Inst., Bethesda, MD. Office of Cancer Communications.
Smoking and Health: An Annotated Bibliography of Public and Professional Education Materials.
Aug 78, 87p OCC/SB-7-78, DHEW/PUB/NIH-79-1841

Contents:
Risk and prevention--Adolescents and children;
Risk and prevention--Adults;
Cessation;
Nonsmokers' rights;
Foreign language materials--French;
Foreign language materials--Spanish;
Teaching resources;
Reference materials;
Additional resources.

N80-28047/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Characteristics of Enzymatic Induction Provoked by Chlordane.
A. Denys, E. Guilbert-ber, and J. Levy. Jun 80, 18p NASA-TM-76194
Contract NASW-3198
Transl. Into English from Therapie (France), V. 30, 1975 p 277-288. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Inst. Of Pharmacology, Paris.

The effects of various stresses, such as restraint and lowering or raising of environmental temperature, in mice pretreated with chlordane were investigated. (Chlordane is an inhibitor of protein synthesis.) It was found that restraint or exposure to a cold environment for three hours mobilized the chlordane stored in the adipose tissue of mice.

PB80-200827 PC **A03**/MF **A01**
Illinois Univ. at the Medical Center, Chicago. School of Public Health.
Distribution of Orally Administered Chrysotile Asbestos in Newborn Baboon Body.
Final rept. 1 Oct 78-30 Sep 79,
Kusum J. Patel-Mandlik. May 80, 27p EPA-600/1-80-022
Contract EPA-CA-8-3307-J

This report presents the results of transmission electron microscopic analyses for asbestos in ten organs of the newborn baboon which was orally administered chrysotile asbestos. The feeding period consisted of nine days with a cumulative dose of 3 x10 to the 13th power chrysotile fibers per kilogram. Analyses of the same ten organs of a control newborn baboon is also included. The test tissues showed higher levels of asbestos than respective control tissues. The highest concentration of chrysotile fibers was found in the kidney cortex followed by lymph nodes, spleen, colon, esophagus, kidney medulla, stomach, and liver. Fiber size distribution of the fibers recovered from all organs is presented.

PB80-202237 PC **A06**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
Proceedings of the Seminar on Biological Monitoring and Its Use in the NPDES (National Pollutant Discharge Elimination System) Permit Program Held at Chicago, Illinois on October 2, 1979,
Timothy O'Mara, and Orville E. Macomber. May 80, 113p EPA-600/9-80-026
Prepared in cooperation with Environmental Protection Agency, Chicago,IL. Region V.

This seminar brought together representatives from industry, state and local governments and biological monitoring consulting firms to present the U.S. Environmental Protection Agency, Region V perspective on biomonitoring requirements for the National Pollutant Discharge Elimination System (NPDES) permit activities. A limited number of industries have the potential for the discharge of toxicants and they will be required to conduct special testing, monitoring and evaluation of their effluents by utilizing biological testing techniques. This seminar was held to clarify the methods and uses of biomonitoring and its application to setting limits in NPDES permits. Presentations were made concerning biological monitoring phytoplanktons, zooplanktons, macroinvertebrates, fish, bacteria, etc. The range of tests include static and flow-through bioassays, including tests for bioaccumulation, Ames tests for mutagenicity, and some rapid assessment methods such as the fish cough response test.

PB80-202468 PC **A05**/MF **A01**
National Research Council, Washington, DC. Div. of Medical Sciences.
Health Effects of Fossil-Fuel Combustion Products: Needed Research.
1980, 81p
Contracts DE-AT02-76CH93010, EPA-68-01-3938

This report is intended to assist researchers in providing information that would be useful to regulatory agencies concerned with the protection of workers and the general public from adverse health effects arising from the use of fossil fuels. It examines the research needed to expand and clarify our understanding of the products of fossil-fuel combustion, chiefly that taking place in stationary sources of power.

PB80-202864 PC **A04**/MF **A01**
Georgia Inst. of Tech., Atlanta. Environmental Resources Center.
Transference Mechanism of Polychlorinated Biphenyl by Aquatic Organisms.
Technical completion rept. Oct 77-Jan 80,
M. K. Hamdy. Jan 80, 61p ERC-01-80, W80-06004, OWRT-A-073-GA(1)
Contract DI-14-34-0001-8011
Prepared in cooperation with Georgia Univ., Athens. Coll. Experiment Station.

Thirteen polychlorinated biphenyls (PCBs) resistant cultures were isolated from sediments containing more than 1000 micrograms PCB/g sediment. These cultures were found to be of the genus Bacillus. The author was able to induce some mutants from these cultures that can grow in laboratory basal salt medium containing high levels of PCB (2500 micrograms PCB/ml medium). These mutants were also able to biodegrade the PCBs (1254) compounds. The effectiveness of this biodegradation varied between mutants and ranged from 42-62%. It is concluded that feasibility studies, on an economical basis, should be looked at with emphasis on end product. Both uptake and concentration factor (CF) of 14C-Polychlorinated biphenyls were determined in several food chain systems and were affected by the trophic level, incubation time and by age of cells. Bacterial cells containing 14C-PCB were fractionated into 5 fractions; cold TCA, alcohol, alcohol-ether, hot TCA, and proteins. Most of the radioactivities were in alcohol (60%) and alcohol-ether fractions (17%) indicating bioaccumulation in cellular lipids. Three day larvae exhibited a 5.14% uptake and 553 CF at 96 hr; 5 day larvae had 2.56% uptake and CF of 209. Guppies showed 3.56% uptake and CF of 197 at 96 hr. It is concluded that all food chain systems examined showed a high level of PCB uptake and concentration factor.

PB80-203458 PC **A04**/MF **A01**
Utah Water Research Lab., Logan.
Evaluation of Mutagenicity Testing of Extracts from Processed Oil Shale.
Water quality series rept.,
Judith G. Dickson, and V. Dean Adams. May 80, 52p UWRL/Q-80/01, W80,-06009, OWRT-B-154-UTAH(1)
Contract DI-14-34-0001-8123

The evaluation of the carcinogenic potential of processed oil shale extracts was carried out by the use of the Ames/Salmonella mutagenicity assay. Four types of spent oil shale were used to obtain samples for testing and the polycyclic aromatic hydrocarbons (PAH) contained in the shale extracts are known to give about 90% detection rate by the Ames test. Soxhlet extraction of the shale with organic solvents gave extracts which were found to contain mutagenically-active fractions. The choice of solvents was shown to have a great effect on the magnitude of the mutagenic response and may also generate a co-mutagenic effect. The Ames test failed to identify mutagens in the aqueous leachates from the spent oil shale. One of the major problems of the Ames test was that the dose response curves of one-to-one mixture of two mutagens were nonadditive. Benzo(a)pyrene, a strong mutagenic PAH, was found to mask the mutagenic response of other mutagens. The complex mixture of PAHs in processed oil shale may exhibit high mutagenicity due to possible co-mutagenesis. Further biological testing is necessary to establish the environmental impact of natural leaching of oil shale waste and the reliability of the Ames test.

PB80-203508 PC **A02**
Delaware Univ., Newark. Coll. of Marine Studies.
Long-Term Effects of Water-Soluble Fractions of Kuwait Crude Oil on the Larval and Juvenile Development of the Mud Crab 'Eurypanopeus depressus',
T. L. Cucci, and C. E. Epifanio. c1979, 9p DEL-SG-2-80, NOAA-80060901
Pub. in Marine Biology, v55 p215-220 1979.

Larvae of the mud crab Eurypanopeus depressus (Smith) were reared in various concentrations of the water-soluble fraction of Kuwait crude oil. The 48-hr TLm (Median tolerance limit) for Zoea Stage I was approximately 10 ppm total dissolved hydrocarbons and that for Zoea Stage II approximately 17 ppm. Chronic toxicity of more dilute solutions (4.3 and 8.7 ppm) was assessed independently for each larval stage and for subsequent developmental stages through Crab Stage 5. In the group continuously exposed to oil from hatching, there was differential mortality relative to controls in every larval stage and increased duration of intermolt periods was observed at every stage through Crab Stage 5. Mortality in groups not exposed until larvae had reached Zoea Stages III or IV was not greater than controls, suggesting that toxicity to advanced larval stages may be related to accumulation of toxic compounds by the larvae. Neither concentration (4.3 or 8.7 ppm) of crude oil caused increased mortality among juvenile crab stages regardless of the time of initial exposure. Increased occurrence of an extra and morphologically abnormal megalopa stage was associated with exposure to the crude oil. This has not been reported before.

PB80-203706 PC **A07**/MF **A01**
Raltech Scientific Services, Inc., Madison, WI.
Adriamycin Cardiotoxicity: A Comparison with Adriamycin, AD-32, N-Trifluoroacetyladriamycin-14-Valerate (NSC No. 246131).
Final rept. 3 May 78-15 Feb 79,
J. Will, G. Splitter, J. Lalich, S. Dennis, and W. Dennis. 30 Mar 79, 132p RSS-246131-1979-11, 43746-11
Contract N01-CM-4-3746

Andriamycin analog NSC No. 246131 was less cardiotoxic than its parent compound. This conclusion is based on histologic, hematologic, clinical chemistry, serum enzyme and electrocardiographic studies. The analog failed to produce renal toxicity; occassional mild myeloid suppression or myocardial toxicity was seen. Animals receiving NSC No. 246131 had lengthened survival time with less weight loss than animals treated with andriamycin. Sp!eens of analog treated rabbits had evidence of considerable extramedullary hematopoiesis, but clinical anemia was not present.

PNL-3189 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.

Biomedical Studies on Solvent Refined Coal (SRC-II) Liquefaction Materials: A Status Report.
Oct 79, 64p
Contract EY-76-C-06-1830

This technical report summarizes the results of biomedical research effort on solvent refined coal (SRC) materials. The samples, described in the text, as well as samples of raw shale oil, crude petroleum, and some SRC-I materials were evaluated for biological activity in several different systems: (1) microbial mutagenesis (Ames assay), coupled to chemical characterization efforts, (2) in vitro mammalian cell toxicity and transformation, (3) epidermal carcinogenesis (skin painting) in mice, (4) acute and subchronic oral toxicity in rats, (5) developmental toxicity in rats, and (6) dosimetry and metabolism in rats. High boiling point materials (identified) showed significant mutagenic activity while lower boiling fractions from both processes were inactive; crude petroleum was also inactive, while raw shale oil showed only a low level of activity. Chemical characterization studies suggested that 3- and 4-ring primary aromatic amines are responsible for a large fraction of the mutagenic activity. Cultured mammalian cell studies showed that materials exhibiting a positive effect in the Ames system also caused mammalian cell transformation. The results of skin carcinogenesis studies in the mouse were generally consistent with those of the cellular studies. Light distillates were found to be moderately toxic after oral administration to rats. Fuel upgrading, process modification, and appropriate occupational/environmental controls may ameliorate some of the biological effects of SRC materials and other coal liquids of high boiling point. Low-boiling SRC liquids appear to have little biological effects in the assays employed. (ERA citation 05:005345)

UCID-18080-79-1 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Mutagenesis Testing with Mammalian Cells: Validating and Adapting a Multiple-Marker Bioassay to Activate and Detect Mutagens in Crude Samples for Energy Technology. Progress Report, January-June 1979.
J. H. Carver, and F. T. Hatch. 9 Oct 79, 37p
Contract W-7405-ENG-48

A Chinese hamster ovary (CHO) cell line heterozygous at both the adenine phosphoribosyltransferase (aprt) and thymidine kinase (tk) loci was used for single-step selection of spontaneous and induced mutants resistant to 8-azaadenine, 6-thioguanine, ouabain, or 5-fluorodeoxyuridine. Mutation data are reported for direct mutagens and promutagens activated by rat liver homogenates. The induced mutant frequencies as a function of relative cell survival after treatment with EMS, DMN, or BP showed locus-specific differences in sensitivity. A very high percentage of the spontaneous and induced drug-resistant clones scored as mutants had substantially diminished enzyme activity at the selected locus. The tk locus showed the largest mutational response. The rapid expression kinetics for FUdR/sup r/ and the possibility that the locus detects a broader spectrum of genetic lesions than the other drug-resistance markers are discussed in terms of a sensitive screening assay for detecting potential mutagens. Four carcinogens were identified as mutagens, and two non-carcinogens were not mutagenic in the system. Two reported non-carcinogens were identified as mutagenic in the system. Four carcinogens that are reported to give negative or erratic results in Salmonella and/or cell transformation assays were negative also in this system. Ethylenethiourea failed to give the expected positive result when tested in this system. To solve the solubility problems encountered with compounds in the International Program, protocols were developed to allow higher concentrations of mutagen exposure by means of dispersal in corn oil emulsions. The techniques are currently being applied to studies on trichlorethylene. (ERA citation 05:003650)

UCID-18174-79-2 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Mutagens from the Cooking of Food. Semiannual Progress Report, March 1-September 30, 1979.
M. L. Mendelsohn. 1 Nov 79, 74p
Contract W-7405-ENG-48

The objectives of this study are as follows: to determine the nature and mechanism of formation of the mutagens formed during the cooking of foods; to quantify mutagen formation; to assess the spectrum of genetic toxicity of the mutagens; to estimate the risk to the human population posed by the ingestion of mutagens derived from the cooking of foods; and to devise strategies to control or prevent mutagen formation. In the first year of the study, progress was made in the following areas: confirmed reports that bacterial mutagens are formed during cooking of hamburger; obtained an increased yield of mutagens by acetone extraction of meat; found that the mutagens are almost exclusively in an alkaline aromatic fraction; found the mutagens to be highly specific for Salmonella strains sensitive to frameshift mutations; studied the metabolic activation of food mutagens by liver homogenate systems; conducted a survey of grilling hamburger on various cooking surfaces, showing marked differences in mutagen formation; demonstrated with boiled beef that the mutagens arise from water soluble, low molecular weight components after prolonged heating; found greater mutagen formaton when beef extract is boiled in stainless steel than in glass; observed enhancement of mutagen formation in boiled beef at acidic and alkaline pH compared to neutral pH; initiated syntheses of labeled mutagenic organic amines, with studies of their pharmacokinetics in rats; analyzed the two largest data bases on the American diet for the principal sources of cooked protein foods; made preliminary calculations which indicate that daily ingestion of 100 g of grilled or fried beef might account for a significant fraction of the incidence of intestinal cancer in man. (ERA citation 05:003643)

UCLA-12-1218 PC **A05**/MF **A01**
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
Trace Element Stress in Plants: Effects and Methodology.
W. L. Berry, and A. Wallace. 1979, 78p CONF-791145-(Absts.)
Contract EY-76-C-03-0012
International symposium on trace elements stress in plants, Los Angeles, CA, USA, 6 Nov 1979.

Although energy technology is a theme which involves many aspects of trace elements, any evaluation of environmental effects must recognize that there are many sources of trace elements in the environment. This symposium considers the effects of the total trace element component of the environment on plants, rather than those from individual sources. The goal is a comprehensive survey of the effects of trace elements on plants which, because of the basic position plants hold, has implications for all food chains. This program highlights the physiological aspects of trace element effects in plants. (ERA citation 05:010682)

UCRL-13909 PC **A02**/MF **A01**
Paine Coll., Augusta, GA.
Ultrastructural Changes in Leaf Cells of Ponderosa Pine and Cotton Exposed to Ozone.
M. Furr. Sep 78, 24p
Contract W-7405-ENG-48

Damage and modifications of plant cell structure by moderate to high levels of ozone were studied in ponderosa pine (Pinus ponderosa Laws.) and cotton (Gossypium hirsuta L. cv 'Acala SJ-2'). Plants were exposed to 0.20 ppM of ozone for six hrs daily. Visible symptoms of ozone damage in the pine included development of tip necrosis, chlorotic mottle, and necrotic lesions or bands in both current and one year old needles. In cotton seedlings, chlorosis developed in the upper cell layers of the leaves and cotyledons. Leaf blade islets were affected prior to any noticeable damage to the vascular systems and early cotyledon abscission was common in fumigated cotton seedlings. Electron microscope observations revealed that ozone altered membranes in the cytoplasmic organelles. Degradation of the granal and thylakoid systems of chloroplastids paralleled the concentration and duration of ozone fumigation. As associated accumulation of lipoidal or osmiophilic spheres in the chloroplastid stroma accompanied the modification of the thylakoid membranes in cotton. Both granal membranes and chloroplastid morphology were altered in ozone damaged pine needles. (ERA citation 04:028131)

7. CHEMISTRY

7A. Chemical Engineering

AED-CONF-77-565-006 PC **A03**/MF **A01**
Rheinische Braunkohlenwerke A.G., Cologne (Germany, F.R.).
Gasification of Brown Coal to Synthesis and Reduction Gas.
F. H. Franke. Dec 77, 33p CONF-771261-6
In German.Conference on coal gasification and hydrogenation, Essen, F.R. Germany, 7 Dec 1977.
U.S. Sales Only.

The Rhine Brown Coal Plant AG in Cologne/FRG is pursuing two development trends of coal gasification: (a) an autothermal conventional gasification process and (b) a gasification process with heat from high-temperature nuclear reactors. The principle of the autothermal method is the Winkler process which is being further developed as a high temperature method based on brown coal (HTW method). The object is to raise reaction pressure and temperature in the gas generator beyond the hitherto known comparable values. Pilot plants already under testing are described. The possibilities of using the HTW method to produce synthetic gas and to include this in the production of methanol as well as using it to produce reduction gas and to couple it with the direct reduction of iron ore are explained here. The profitableness of these coupling processes is discussed. (ERA citation 04:025172)

BCRA-62 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Investigation of Various Methods of Recovering Solids from Solids-Bearing Effluents Produced by the Preparation and Charging of Preheated Coal to the 6.5-M Oven at BCRA.
Dec 78, 22p
U.S. Sales Only.

A study was conducted to examine, evaluate and compare different methods of dewatering effluents containing carryover fines. Of the limited number of dewatering systems tested, the most efficient were as follows: For treating the preheater-washer effluent, the rotary vacuum drum-filter with belt discharge performed very well, giving the cleanest filtrate and highest recovery. The decanter centrifuge produced a dirtier centrate which, however, up to some limit, should have no adverse consequences. For treating the charging-main effluent, excellent performance was shown by the pusher centrifuge, provided that the tar content of the solids was not excessive. The peeler centrifuge also performed well but with a lower throughput relative to machine size. The decanter centrifuge and the rotary vacuum drum-filter both performed well but gave a wetter product than those from the pusher and peeler centrifuges. The rotary vacuum drum-filter had a much higher rate of throughput with charging-main effluent than with preheater-washer effluent. For treating mixtures of preheater-washer and charging-main slurries, the rotary vacuum drum-filter with belt discharge and the decanter centrifuge performed well but the decanter centrifuge gave a dirtier centrate (filtrate). No large-scale trials of the peeler centrifuge were carried out on mixed slurries, but laboratory trials indicated that this machine should operate well and give the driest product, although little is known about the peeling and heel-blinding characteristics of the dense mixtures of dry fines. For efficient and economical operation, pre-thickening of solids-bearing effluents is required in all of the systems tested. The choice of system for any specific appli-

cation will of course be influenced by considerations of the relative costs. (ERA citation 05:021569)

PB80-202518 PC **A13**/MF **A01**
Catalytic, Inc., Philadelphia, PA.
Desalting Handbook for Planners (Second Edition).
Sep 79, 299p OWRT/TT-80-3, W80-06013
Contract DI-14-34-0001-8701
Also pub. as OWRT-8701(1). See also report dated May 72, PB-253 755.

This revised Handbook has extensive updating of text material and cost curves, primarily resulting from the most currently published literature from the Office of Water Research and Technology (OWRT). All chapters of this Handbook have been comprehensively revised to reflect latest technology and most recent costing information available to the desalting field. Major sources of data are referenced in the Handbook. Data together with background information and input from OWRT is compiled in a form suitable for water planner's use. The Handbook has been prepared for use in preliminary planning as a source of up-to-date information on the state of development, costs, economics, and applicability of those desalting processes which are available for providing water supply. It is anticipated that the Handbook will fill a particular need in conducting Western U.S. Water Plan Studies. The Handbook is not meant to substitute for the thorough engineering and economic analysis that should precede the decision to build a desalting plant.

UCID-18282 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Oil Shale Project Small Retort Run Summary, Run S-15.
F. J. Ackerman, W. A. Sandholtz, J. H. Raley, R. G. Mallon, and J. F. Carley. Sep 79, 67p
Contract W-7405-ENG-48

Run S-15, the third in a series of steam/air combustion runs, in the 125-kg retort, was identical to Runs S-13 and S-14 in input gas parameters. The principal difference among these runs was the size distribution of the raw shale charge: S-13, -2.5 + 1.3 cm; S-14, -7.6 + 0.001 cm; and S-15, -2.5 + 0.001 cm. Objective was to determine if lower oil yields and the flow nonuniformities evidenced by rough irregular axial temperature profiles in S-14 and L-1 were attributable primarily to the larger particles (+ 2.5 cm). Temperature profiles from previous runs on small uniform shale particles (e.g., S-13) were smooth and regular and oil yields were high (> 90% of Fischer assay). The run was straightforward and ran as predicted. Centerline bed temperatures averaged 1025 exp 0 C, the highest yet observed in a 125-kg retort run. This produced some wrinkling of the 304 stainless steel retort vessel. Oil yield from S-15 was comparable to that of S-14 (86% vs 88% Fischer assay). The S-15 temperature profiles were as rough as those from S-14. Run S-15 to the conclusion that fines (< 1.3 cm) also contribute to flow nonuniformities, temperature excursions, and yield loss. One hypothesis is that packed fines with their low permeability (especially if they retain process liquids) divert flows as effectively as blocks. Hydrogen production in S-15, 0.38 wt % of raw shale, was the highest yet observed from LLL retorts. This is attributed mainly to the smaller particle size of the shale charge. Pockets of dark shale (unconsumed char) were observed in the lower portion of the bed when the spent shale was unloaded. Consistent with this was the delay, or even absence, of oxygen appearance in intra-retort gas sampled near these pockets. Thus, nonuniformities in gas flow were particularly evident in these regions. (ERA citation 05:002539)

UCRL-83531 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Effect of Particle Size Distribution and Flow Non-Uniformities on Dispersion in Porous Media: Application to Oil Shale Retorts.
Oct 79, 30p CONF-790398-1
Contract W-7405-ENG-48
Multiphase flow and heat transfer symposium, Miami, FL, USA, 16 Mar 1979.

This paper considers the effects of particle size distribution and flow nonuniformities on the dispersion of an inert tracer in porous media using some simplified models, and compares the results to recent dispersion data taken on external retorts filled with oil shale particles. The effect of the particle size distribution is analyzed by studying the dispersion of a tracer in a series of infinite parallel pores of varying diameters. The pores are considered to be in either laminar or turbulent flow. The predicted dispersion coefficient of the porous medium is shown to be a function of the Peclet number and the higher moments of the distribution of pore radii. The Peclet number dependence is in agreement with experimental measurements, as is the qualitative dependence on particle size distribution. The effect of flow nonuniformities is studied by analyzing the dispersion of an inert tracer in a packed bed with two annular regions of different interstitial velocities. The dispersion coefficient for the area-averaged concentration is shown to be a very sensitive function of the parameters in the flow distribution. The dispersion coefficients measured in external retorts or packed beds filled with oil shale particles are much higher than those previously measured using uniform particles of the same average size. These differences can be accounted for if one allows for the possibility of having a significant contribution from flow nonuniformities. (ERA citation 05:005386)

7B. Inorganic Chemistry

RFP-Trans-261 PC **A03**/MF **A01**
Thorium Compounds.
A. Rosenheim, V. Samter, and J. Davidsohn. 1903, 40p
Contract EY-76-C-04-3533
A , Z. Anorg. Chem. 35 P424-453 1903.

Preparation of the following thorium compounds is discussed: thorium chloride, thorium bromide, thorium iodide, thorium double fluorides, thorium double sulfates, thorium double carbonates, thorium double oxalates, thorium double tartrates, thorium double malates, and compounds of anhydrous thorium chloride with organic substances which contain oxygen. (ERA citation 04:031046)

7C. Organic Chemistry

CNAEM-158 PC **A02**/MF **A01**
Cekmece Nuclear Research and Training Center, Istanbul (Turkey).
Preparation and Radiopharmaceutical Control of exp 169 Yb EDTA an Agent for Kidney Function and Scintigraphy.
G. Gulbaba, 1976, 13p
In Turkish.
U.S. Sales Only.

Exp 169 Yb was produced by thermal neutron irradiation of Yb sub 2 O sub 3 in 1 MW research reactor at Cekmece Nuclear Research Center. Exp 169 Yb-EDTA complex was then prepared with a sodium salt of EDTA. Radionuclidic and radiochemical purities of the compound were determined by gamma spectral analysis and radiochromatography-electrophoresis following preparation. Ionic Yb(III) which accumulates at bone and liver was not observed on the radiochromatographic and electrophoretic analysis of the final compound. There was no separation of the label for two months of examination in order to determine stability of the compound. In conclusion, the labeled compound has been prepared for use in the external scanning of kidney and determining the glomerular filtration rate. The label appears to be firmly bound so that the agent can be stored for a reasonably long period as 31 days half-life of exp 169 Yb permits. Administration of the compound is safe from the standpoint of radiation dose since a 30 micro-Ci exp 169 Yb-EDTA for a glomerular filtration study delivers no more than 0.4 mrad whole-body and 5 mrad kidney dose. (Atomindex citation 10:420411)

PAT-APPL-6-094 814 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Homocysteine Thiolactone Perchlorate and a Method of Making Same.
Patent Application,
Kilmer S. McCully. Filed 16 Nov 79, 19p PB80-208697
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Homocysteine thiolactone perchlorate is prepared from the corresponding homocysteine thiolactone hydrochloride and optimally about two equivalents of perchloric acid as reactants. The product perchlorate salt is soluble in organic solvents, whereas other known salts such as the hydrochloride are only water soluble. This property is thought to influence the growth effect of the perchlorate salt in animals, such as rabbits, and to influence the unique effect of the perchlorate salt on the growth of malignant tumors in animals, such as mice.

PATENT-4 207 308 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Process for Purifying Iodinated Bile Acid Conjugates.
Patent,
Jerry G. Spenney. Filed 13 Jun 77, patented 10 Jun 80, 17p PB80-210982, PAT-APPL-805 960
Supersedes PB-297 968.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Iodinatable bile salt derivatives are obtained by providing bile salts and their glycine and taurine conjugates with iodinatable groups. The radioiodinated compounds are useful in the radioimmunoassay of bile salts and in physiological studies. The preferred compound is cholyglycylhistamine. The synthesis of radioiodinated conjugates and their purification by extraction and silica gel chromatography are described.

PATENT-4 210 639 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
5'-Deoxy-5'-(Isobutylthio)-3-Deazaadenosine, Method of Making Same and Its Antiviral Effect on Rous Sarcoma Virus and Gross Murine Leukemia Virus.
Patent,
Filed 29 Aug 78, patented 1 Jul 80, 7p PB80-211022, PAT-APPL-937 704
Supersedes PB-290 092.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is 5'-Deoxy-5'-(isobutylthio)-3-deazaadenosine and a method for preparation of same. In the preparation, 3-dezaadenosine is utilized as a starting material and is chlorinated at the 5' position. Subsequently, the chloro group is converted to isobutylthio by reaction with isobutyl mercaptan in ethanol containing sodium methoxide giving the desired compound. This new compound has good activity as an adenosylhomocysteine (AdoHcy) hydrolase inhibitor and has shown activity against Rous sarcoma virus (RSV) in chick embryo cells and Gross murine leukemia virus (Gross MLV) in mouse embryo cells, where the activity is as a non-competitive inhibitor of AdoHcy hydrolase showing a Ki of 0.4 mM.

7D. Physical Chemistry

AD-A086 275/5 PC **A02**/MF **A01**
Princeton Univ NJ Dept of Electrical Engineering and Computer Science
The GaAs(110)-Oxygen Interaction: A LEED Analysis. II.
Technical rept.,
A. Kahn, D. Kanani, and Peter Mark. 16 Nov 79, 10p Rept no. TR-61-ONR
Contract N00014-75-C-0394, Grant NSF-ENG75-18529

Pub. in Surface Science, v94 p547-554 1980.

No abstract available.

AD-A086 276/3 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia
Electronic Structure of Polyacetylene: Optical and Infrared Studies of Undoped Semiconducting (CH)x and Heavily Doped Metallic (CH)x.
Technical rept.,
C. R. Fincher, Jr., M. Ozaki, M. Tanaka, D. Peebles, and L. Lauchlan. 23 Jan 79, 19p Rept no. TR-79-5
Contract N00014-75-C-0962
Pub. in Physical Review B, v20 n4 p1589-1602, 15 Aug 79.

No abstract available.

AD-A086 277/1 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia
Electrochemistry of Polyacetylene, (CH)x: Electrochemical Doping of (CH)x Films to the Metallic State.
Technical rept.,
Paul J. Nigrey, Alan G. MacDiarmid, and Alan J. Heeger. 2 Feb 79, 8p Rept no. TR-79-6
Contract N00014-75-C-0962
Pub. in Jnl. of the Chemical Society, Chemical Communications, p594-595 1979.

No abstract available.

AD-A086 278/9 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia
Organic Metals and Semiconductors: The Chemistry of Polyacetylene, (CH)x, and Its Derivatives,
Alan G. MacDiarmid, and Alan J. Heeger. 1979, 22p Rept no. TR-79-7
Contract N00014-75-C-0962
Pub. in Synthetic Metals, v1 p101-118 1979/1980. Presented at the Symposium on the Structure and Properties of Highly Conducting Polymers and Graphite, held in San Jose, CA, 29-30 Mar 79.

No abstract available.

AD-A086 286/2 PC **A02**/MF **A01**
Chicago Univ IL Dept of Chemistry
The Control of Isomer Distributions in Nitration Reactions.
Final rept. 12 May 76-30 Mar 80,
Leon M. Stock. 10 Jun 80, 16p ARO-13957.4-CX
Grant DAAG29-76-G-0251

The direct metalation of benzene and its derivatives by mercury(II), thallium(III), lead(IV), and palladium(II) has been investigated. Mercury(II) and palladium(II) catalyze the nitration of toluene and other aromatic compounds. A novel isomer distribution is realized because the metallation reaction is the rate-controlling and product-controlling step. The nitration of toluene via thallation-nitrosode thallation produces a more random product distribution in a non-catalytic reaction. The plumbylation of toluene is an unusually selective reaction. The aryllead(IV) com pounds can be cleaved by a variety of reagents to form carbon-halogen, carbon-nitrogen, carbon-sulfur, and carbon-carbon bonds. This research has established that the nitronium ion carrier approach is not a fruitful one for the alteration of product distributions in nitration reactions. It seems doubtful that isomer distributions can be, in general, controlled by tactics of this kind. On the other hand, this research work indicates that the metal mediated electrophilic substitution reactions offer an effective approach for the control of isomer distributions. More work is needed in this area to exploit this method for catalysis and the simultaneous control of isomer distributions in a variety of substitution reactions.

AD-A086 347/2 PC **A02**/MF **A01**
Princeton Univ NJ Dept of Mechanical and Aerospace Engineering
Inversion of Spectral Lineshapes to Yield Collisional Rate Constants.
Status rept. no. 1, 1 Sep 78-31 Aug 80,
J. Gelfand, H. Rabitz, and R. B. Miles. 1 Jun 80, 13p
Contract N00014-78-C-0721

State-to-state collisional energy transfer rates are being obtained by the inversion of pressure broadened linewidth data. Measurements of linewidths in overtone vibration-rotation transitions have yielded information rotationally elastic and inelastic collision rates for vibrationally excited HCl. Work is continuing in acquiring similar information for vibrationally excited HF and DF using tunable laser photoacoustic spectroscopy. (Author)

AD-A086 368/8 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Dynamics of the Continuously Stirred Tank Reactor Having Consecutive Reactions A yields B yields C.
Technical summary rept.,
D. C. Halbe, and A. B. Poore. Mar 80, 33p Rept no. MRC-TSR-2052
Contract DAAG29-75-C-0024

The possible combinations of stable and unstable multiple steady states and bifurcating periodic orbits for the continuously stirred tank reactor having consecutive exothermic chemical reactions A yields B yields C are found by an extensive numerical search. The resulting response diagrams demonstrate the jump phenomena that are possible during the reactor start-up and shut-down, and they serve as a model for the possible dynamics in other reactor problems, e.g. the tubular reactor and catalyst particle. Furthermore, the methods as used here for lumped parameter systems apply equally well to distributed parameter systems when certain notational changes are made. (Author)

AD-A086 376/1 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Arrhenius Systems: Dynamics of Jump Due to Slow Passage through Criticality.
Technical summary rept.,
A. K. Kapila. Mar 80, 34p Rept no. MRC-TSR-2059
Contract DAAG29-75-C-0024

Reactive systems involving Arrhenius kinetics often exhibit multiple steady states. A typical response is an S-curve, whose turnaround points correspond to ignition or extinction. This paper describes the dynamics of transition from the extinguished to the ignited state as the reaction-rate parameter is slowly varied through the critical value. Both lumped and spatially distributed models are studied. The asymptotic analysis is based on the largeness of two parameters: one characterizing the activation energy and the other the slow passage. (Author)

AD-A086 411/6 PC **A02**/MF **A01**
Purdue Univ Lafayette IN Dept of Chemistry
Evidence for a Recombination Mechanism of Cluster Emission from Ion Bombarded Metal Surfaces,
N. Winograd, K. E. Foley, B. J. Garrison, and D. E. Harrison, Jr. 20 Jun 79, 4p AFOSR-TR-80-0382
Grant AFOSR-76-2974
Pub. in Physics Letters, v73A n3 p253-255, 17 Sep 79.

No abstract available.

AD-A086 413/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
High-Resolution X-Ray Study of a Smectic-A - Smectic-C Phase Transition,
C. R. Safinya, M. Kaplan, J. Als-Nielsen, R. J. Birgeneau, and D. Davidov. 18 Jul 79, 6p
Contract DAAG29-78-C-0020, Grant NSF-DMR76-80895
Pub in Physical Review B, v21 n9 p4149-4153, 1 May 80. Prepared in cooperation with Kent State Univ., OH.

No abstract available.

AD-A086 414/0 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Re-Evaluation of the Hyperfine Coupling Constants for B-X Transitions in I2.
R. P. Hackel, L. A. Hackel, and S. Ezekiel. 2 Oct 79, 3p
Contract DAAG29-78-C-0020
Pub. in Physical Review A, v21 n4 p1342-1343 Apr 80.

No abstract available.

AD-A086 418/1 PC **A02**/MF **A01**
Aerodyne Research Inc Bedford MA Center for Chemical and Environmental Physics
Infrared Spectral Measurements of Species in A High Temperature Flow Tube,
Michael E. Gersh, and Charles E. Kolb. 1979, 16p AFOSR-TR-80-0435
Contract F49620-77-C-0075
Pub. in Proceedings of the Materials Research Symposium on Characterization of High Temperature Vapors and Gases Held at National Bureau of Standards, Gaithersburg, MD 18-22 Sep 78, NBS-SP-561, p679-693.

No abstract available.

AD-A086 434/8 PC **A02**/MF **A01**
IRT Corp San Diego CA
Merging-Beams Experiments with Excited Atoms,
R. H. Neynaber. 1979, 16p IRT-8173-005, AFOSR-TR-80-0430
Contract F49620-78-C-0015
Pub. in Electronic and Atomic Collisions, n11 p287-300 1980.

No abstract available.

AD-A086 497/5 MF **A01**
Toronto Univ Downsview (Ontario) Inst for Aerospace Studies
Studies of Laser Selective Excitation of Atoms,
Norbert Drewell. Dec 79, 150p UTIAS-229, AFOSR-TR-80-0507
Grant AFOSR-76-2902
Availability: Available in microfiche only.

Sample preparation through laser ablation of a solid target under vacuum has been combined with short-pulsed laser selective excitation to create a new and convenient experimental technique for measuring atomic radiative lifetimes. The lifetimes of the three resonance states of chromium determined in this way compare very favourably with those found through other experimental means. In addition, the technique has been extended to demonstrate experimentally the potential for plasma diagnostics using two-wavelength selective excitation with short laser pulses. The ratio of population densities of two energy states of chromium atoms has been measured as a function of time during the expansion of the ablation plasma. Extended saturation pumping of the resonance transition in sodium vapour has been investigated theoretically. Rate equations for 20 energy levels in the sodium atom, and the rate equations for the free electrons, were integrated numerically. It has been found that multiphoton ionization, combined with superelastic heating of free electrons can account for the rapid and complete ionization of an un-ionized vapour, as reported in the literature. The detailed theoretical results have led to the development of a simple model which accurately predicts the temporal variation of electron density. (Author)

AD-A086 500/6 PC **A02**/MF **A01**
Maine Univ Orono Dept of Physics and Astronomy
Chemisorption on Stepped Surfaces: O/Stepped W8 (110).
Technical rept.,
P. Kleban, and R. Flagg. Jun 80, 24p Rept no. TR-1
Contract N00014-79-C-0441

In a previous study we have developed a general theory of chemisorption on certain stepped surfaces; namely those for which a lattice gas in thermodynamic equilibrium is an appropriate model. We showed there that a comparison of LEED (Low Energy Electron Diffraction) results for flat and stepped substrates can determine the change in adsorption energy at terrace edge sites. In the present work we demonstrate this via detailed Monte Carlo calculations for 0 on a certain stepped W(110) surface. We use oxygen adatom-adatom (AA) interaction energies previously determined by experimental and theoretical studies on flat W(110). By comparison with experimental results for the stepped surface system we find that

the 0 binding energy is less strong at either terrace edge for this particular surface and defect. (Author)

AD-A086 624/4 PC **A02**/MF **A01**
Pennsylvania State Univ University Park Dept of Chemistry
X-Ray Photoemission Studies of Atom Implanted Matrices: Ni in Carbon,
R. A. Gibbs, N. Winograd, and V. Y. Young. 6 Dec 79, 8p AFOSR-TR-80-0493
Grant AFOSR-80-0002
Pub. in Jnl. of Chemical Physics, v72 n9 p4799-4804, 1 May 80.

No abstract available.

AD-A086 628/5 PC **A02**/MF **A01**
Aerochem Research Labs Inc Princeton NJ
HTFFR Kinetics Studies of the Ge/N2O Chemiluminescent Reaction,
Arthur Fontijn, and William Felder. 16 Jul 79, 11p AFOSR-TR-80-0477
Contract F44620-76-C-0108
Pub. in Jnl. of Chemical Physics, v72 n8 p4315-4323, 15 Apr 80.

No abstract available.

AD-A086 636/8 PC **A02**/MF **A01**
Columbia Radiation Lab New York
Observation of Collisional Velocity Changes Associated with Atoms in a Superposition of Dissimilar Electronic States.
Rept. for 1 Jun 79-31 May 80,
T. W. Mossberg, R. Kachru, and S. R. Hartmann. 25 Sep 79, 6p
Contracts N00014-78-C-0517, DAAG29-77-C-0079
Pub. in Physical Review Letters, v44 n2 p73-77, 14 Jan 80.

No abstract available.

AD-A086 637/6 PC **A02**/MF **A01**
Columbia Radiation Lab New York
Noble-Gas-Induced Broadening of Transitions to Rydberg S and D States in Atomic Sodium.
Rept. for 1 Jun 79-31 May 80,
R. Kachru, T. W. Mossberg, and S. R. Hartmann. 28 Aug 79, 9p
Contracts N00014-78-C-0517, DAAG29-77-C-0019
Pub. in Physical Review A, v21 n4 p1124-1133 Apr 80.

No abstract available.

AD-A086 649/1 PC **A02**/MF **A01**
California Univ Berkeley Lawrence Berkeley Lab
Random Choice Methods with Applications to Reacting Gas Flow,
Alexandre Joel Chorin. 28 Oct 76, 21p
Contract N00014-76-C-0316
Pub. in Jnl. of Computational Physics, v25 n3 p253-272 Nov 77.

No abstract available.

AD-A086 662/4 PC **A04**/MF **A01**
Battelle Columbus Labs OH
Quantum Mechanical Studies of Molecular Hyperpolarizabilities.
Final technical rept.
30 Apr 80, 68p AFOSR-TR-80-0466
Contract F49620-78-C-0046

The objectives of this effort are threefold: (I) Develop state-of-the-art quantum mechanical methods to predict, from first principles, hyperpolarizabilities of atoms and molecules; (II) Determine why previous theoretical calculations have not been able to even provide order of magnitude estimates of experimental hyperpolarizabilities; and (III) Apply the quantum mechanical techniques developed in this work to predict hyperpolarizabilities and non-linear susceptibilities for a number of atoms and molecules of interest. This effort will provide complementary information to on-going experimental efforts directed toward obtaining hyperpolarizabilities.

AD-A086 677/2 PC **A02**/MF **A01**
Rochester Univ NY Dept of Chemistry
Molecular Collisions in a Laser Field: Basis Set Selection and Rotating-Wave Approximation,
Paul L. Devries, Kai-Shue Lam, and Thomas F. George. 1979, 13p AFOSR-TR-80-0494
Contract F49620-78-C-0005
Pub. in International Jnl. of Quantum Chemistry, Quantum Chemistry Symposium, v13 p541-551 1979.

No abstract available.

AD-A086 678/0 PC **A02**/MF **A01**
Rochester Univ NY Dept of Chemistry
Quantum-Stochastic Approach to Laser-Stimulated Desorption Dynamics and Population Distributions of Chemisorbed Species on Solid Surfaces,
Jui-teng Lin, and Thomas F. George. 17 Apr 79, 18p AFOSR-TR-80-0495
Contract F49620-78-C-0005, Grant NSF-CHE77-27826
Pub. in Jnl. of Chemical Physics, v72 n4 p2554-2569, 15 Feb 80.

No abstract available.

AD-A086 679/8 PC **A05**/MF **A01**
Rochester Univ NY Dept of Chemistry
Semiclassical Theory of Electronically Nonadiabatic Transitions in Molecular Collision Processes,
Kai S. Lam, and Thomas F. George. 1980, 85p AFOSR-TR-80-0496
Contract F49620-78-C-0005, Grant NSF-CHE77-27826
Pub. in Semiclassical Methods in Molecular Scattering and Spectroscopy, p179-261 1980.

No abstract available.

AD-A086 680/6 PC **A02**/MF **A01**
Rockwell International Anaheim CA Electronics Research Center
Galvanostatic Transients in Lutetium Diphthalocyanine Films,
M. M. Nicholson, and F. A. Pizzarello. 10 Jul 79, 8p AFOSR-TR-80-0491
Contract F49620-77-C-0074
Pub. in Jnl. of Electrochemical Society, v127 n4 p821-827 Apr 80.

No abstract available.

AD-A086 691/3 PC **A03**/MF **A01**
Rockwell International Anaheim CA Electronics Research Center
Investigation of Electrochromic Diphthalocyanines.
Final rept. 1 Apr 77-31 Mar 80,
M. M. Nicholson, R. V. Galiardi, F. A. Pizzarello, and G. A. Layman. Jun 80, 40p C80-413/501, AFOSR-TR-80-0536
Contracts F49620-79-C-0104, F49620-77-C-0074

Lanthanide diphthalocyanine films on tin oxide electrodes in contact with aqueous electrolytes exhibit a series of color changes on variation of the applied potential. The results confirmed that the color changes were due to faradaic reactions rather than temporary field effects. They provided information on the stoichiometry and kinetics of the electrode processes and on the stabilities of color-converted forms of the dye. The lutetium diphthalocyanine film was initially green. By simple chemical and electrochemical diagnostic experiments, it was found that a blue cathodic product formed with utilization of hydrogen ion. The blue material was converted to green by reaction with oxygen. Anodic reactions could produce more than one red form of the dye, generally without a pH change in the electrolyte. The red materials were strong oxidizing agents. Thin-layer electrochemical measurements confirmed the participation of protons in the cathodic process. The thin-layer cell design, which included a shallow, precisely etched glass cavity, may prove useful in other research. A complementary solid-state electrochemical investigation of lutetium diphthalocyanine in this laboratory led to the proposal that anodic oxidation occurred by rapid migration of anions from the electrolyte into the solid organic film.

AD-A086 694/7 PC **A02**/MF **A01**
Alabama Univ University Dept of Chemistry
Photogeneration of Polymer-Anchored Catalytic Species from Iron Carbonyls,
Charles U. Pittman, Jr., Robert D. Sanner, Mark S. Wrighton, Richard G. Austin, and William D. Honnick. 1979, 22p Rept nos. TR-25-ONR, TR-19-ONR
Contract N00014-75-C-0689
Pub. in Fundamental Research in Homogeneous Catalysis, v3 p603-619 1979. Prepared in cooperation with Massachusetts Inst. of Tech. Cambridge, Dept. of Chemistry. Contract N00014-75-C-0880.

No abstract available.

AD-A086 710/1 PC **A02**/MF **A01**
Defence Research Establishment Atlantic Dartmouth (Nova Scotia)
Quantitative Electron Probe Microanalysis Using a Scanning Electron Microscope and an X-Ray Energy Spectrometer.
Technical memo.,
Dwight E. Veinot. Apr 80, 22p Rept no. DREA-TM-80/A
Abstract in French.

A procedure was developed to utilize a scanning electron microscope and X-ray energy spectrometer to obtain quantitative elemental analysis. The precision and accuracy of an X-ray intensity ratio data processing technique has been evaluated. In general, the quantitative results obtained were accurate to better than + or - 1 percent of the certified elemental compositions of standard reference materials for all elements present at greater than 2 weight percent. Results were reproducible to better than 1 percent of the determined percentage compositions. Elements present at less than 0.1 weight percent composition and elements having atomic numbers less than 11 (sodium) were not detected. (Author)

AD-A086 733/3 PC **A03**/MF **A01**
Syracuse Univ NY Dept of Chemical Engineering and Materials Science
Surface Physics and Chemistry of Electrical Contact Phenomena.
Annual rept. 1 Oct 79-31 Aug 80,
Richard W. Vook. 1 Jun 80, 30p
Contract N00014-79-C-0763

The vacuum surface segregation of impurities on copper slip ring materials was studied by Auger electron spectroscopy. In addition the surface chemical composition, electrical contact resistance, and friction were measured in situ for a copper slip ring rotating in vacuum against two copper wire brushes running in separate tracks. The results are embodied in reprints and preprints of 4 papers attached as appendices to the report. (Author)

AD-A086 759/8 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Chemistry
Ready Cage Exchange Reactions of Icosahedral Hydridophoshinorhodacarbaboranes.
Technical rept.,
Todd B. Marder, Judith A. Long, and M. Frederick Hawthorne. 24 Jun 80, 14p Rept no. TR-110
Contract N00014-76-C-0390

Four coordination sites of formally six coordinate Rh(III) complexes have been replaced in facile, single-step thermal reactions. Several reports have appeared concerning thermal ligand exchange reactions of ferrocene related complexes, arene chromium tricarbonyl complexes, and photolytic exchanges using eta to the 5th power-(C5H5)2MC1n(m=v,Ti,Zr,Hf;n=0,1,2). Most of the thermal reactions seem to require vigorous conditions and the yields are in general rather low. However, Khan and Dormond have recently reported facile, thermal exchange of cyclopentadienyl rings in certain Ti complexes. In the course of our studies on homogeneous alkene hydrogenation catalyzed by phosphino-metallocarbaboranes we have discovered a general and facile method for transferring the (PPh3)2Rh fragment form one carbaborange cage to another.

AD-A086 762/2 PC **A04**/MF **A01**
General Applied Science Labs Inc Westbury NY
R2D2-A Fortran Program for Two-Dimensional Chemically Reacting, Hyperthermal, Internal Flows, Volume II.
Final rept. 15 May 78-30 Sep 79,

Gertrude Weilerstein, Robert Ray, Gabriel Miller, and John Erdos. Jan 80, 65p GASL-TR-254-VOL-2, AFFDL-TR-79-3162-VOL-2
Contract F33615-78-C-3016
See also Volume 1, AD-A085 225.
Availability: Microfiche copies only.

Program R2D2, A Fortran program for finite difference solution of the unsteady equations of motion of an inviscid, chemically reacting and/or vibrationally excited mixture of gases in a two-dimensional (planar or axisymmetric) duct, is described. The formulation and method of analysis has been outlined in Volume I of this report. The present volume describes the input, output, and operational procedures of the program. A summary flow chart of the main program is also presented, and the functions of all subroutines are outlined. Instructions for changing the thermochemical Block Data and the program dimensions are also presented. (Author)

AD-A086 772/1 PC **A04**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
AB Initio Prediction of Thermochemical Parameters for Flame Species.
Technical rept.,
George F. Adams, and Gary D. Bent. May 80, 75p ARBRL-TR-02240, AD-E430 471

Electronic structure calculations using theoretical methods based on the linked-diagram theorem are reported for a series of dissociation and isomerization reactions. Analysis of the results of the calculations leads to accurate predictions of dissociation energies for the molecules CH3OH, CH3O, CH2O and CHO. The dissociation of formaldehyde to molecular products and the rearrangement of formaldehyde to hydroxycarbene are also studied and the results agree with a previous study. The implication of the various formaldehyde reactions to combustion chemistry models is discussed.

AD-A086 783/8 PC **A02**/MF **A01**
Naval Research Lab Washington DC
A Laboratory Study of the Dielectric Heating of Molecular Sieve Material.
Final rept.,
R. R. Smardzewski, and R. A. DeMarco. 27 May 80, 21p NRL-MR-4231, AD-E000 462

Rapid desorption of CO2 and H2O from zeolite molecular sieve bed was initiated by the application of a high energy radio frequency field. In the experimental arrangement, molecular sieve material (0.5 Kg) comprised the dielectric between the plates of a specially designed, vacuum evacuable, capacitor which formed part of a high voltage L, C-pi coupled network. After application of a 13.56 MHz RF field at power levels of 0.5-1.5 KW, the loaded sieve bed experienced a rapid increase in temperature to a plateau level near 100 C. The CO2 level in the evolving gas increased rapidly with temperature to 100 C and peaked shortly thereafter, accompanied by significant desorption of water. At this point, rapid circuit detuning occurred and a very high reflected power level was maintained during the remainder of the heating process. Anhydrous molecular sieves containing CO2 do not absorb RF energy to any significant extent. (Author)

AD-A086 829/9 PC **A02**/MF **A01**
California Univ Santa Barbara
Energy Transfer and Optical Spectroscopy of Diatomic Molecules in Chemically Reacting Systems.
Final rept. 1 Aug 76-31 Dec 79,
H. P. Broida, and David O. Harris. Dec 79, 8p AFOSR-TR-80-0540
Grant AFOSR-77-3138

Increased capabilities in remote sensing, communication and several other areas depend on developments in laser technology. Chemical lasers indicate a high probability of fulfilling these needs through their properties of different wavelengths, high power, high operating efficiency and lower weight. Additionally, optically pumped metal dimers are attractive systems for visible, tunable gas lasers. The development of new improved chemical laser systems and optically pumped laser systems requires an increased understanding and knowledge of the properties and characteristics of candidate reactions and molecules. Detailed spectroscopic studies on both CuF and Ca2 have been carried out. Use of laser photoluminescence has produced spectroscopic information previously unobtainable. We have obtained improved molecular constants and dissociation energies, radiative lifetimes, and quenching cross-sections for electronically excited products. In addition previously unknown electronic states have been identified.

AD-A086 870/3 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia
Organic Metals and Semiconductors: The Chemistry of Polyacetylene, (CH)x, and its Derivatives.
Interim technical rept.,
Alan G. MacDiarmid, and Alan J. Heeger. 24 Nov 79, 12p Rept no. TR-79-11
Contract N00014-75-C-0962
Presented at the International Congress of Quantum Chemistry (3rd), Kyoto, Japan, Oct 79.

Polyacetylene, (CH)x , is the simplest possible conjugated organic polymer and is therefore of special fundamental interest. In a series of studies, Shirakawa and Ikeda have shown that it can be prepared in the form of lustrous, silvery, flexible, polycrystalline films having any desired cis/trans content by catalytic polymerization of gaseous acetylene, C2H2. The cis-rich films can be stretched easily at room temperature in excess of three times their original length with concomitant partial alignment of the (CH)x fibrils. Dark red gels of toluene in (CH)x may be prepared using a lower catalyst concentration. Highly porous, very low density, 'foam-like' (CH)x can be obtained from these gels. Both cis- and trans-(CH)x are p-type semiconductors which can be treated with a variety of p- or n-type dopants with concomitant increase in conductivity to give a series of semiconductors and ultimately, 'organic metals.' This report will be directed primarily towards f description of the more chemically oriented aspects of (CH)x and its derivatives. (Author)

AECL-6180 PC **A04**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Mass Transfer Efficiency of Box Downcomer Trays.
D. D'Arcy. May 78, 56p
U.S. Sales Only.

A finite difference scheme is described for solving the partial differential equation of mass transfer for a multiple box downcomer sieve tray. The solution for the concentration of the mass transfer species in the liquid at each point on the active part of the tray depends only on the parameters Pe and lambdaEsub(0G) and on the positions of the inlet and outlet edges of the active area. Numerical solutions were obtained and the results are summarized for a range of parameter values of interest in the Girdler-Sulfide process for the production of heavy water. However, the results are equally valid for any system having the same lambdaEsub(0G), Pe and tray geometry. The finite difference scheme was found to produce suitably accurate results for Pe $<=$ 25, by which value Esub(MV)/Esub(0G) appears to have come at least very close to its maximum value. The applicability of the outlet boundary condition was also investigated. It was found, for the chosen grid spacing, that the outlet boundary condition should not be applied when Pe $>$ 3. (Atomindex citation 09:411444)

AED-Conf-77-407-010 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Solvent Isotope Effect on the Fluorescence of Azoalkanes.
M. J. Mirbach, M. F. Mirbach, W. R. Cherry, N. J. Turro, and P. Engel. 1977, 1p
U.S. Sales Only.

A study of fluorescence quantum yields and fluorescence lifetimes of two cyclic azoalkanes reveal a striking dependence of phisub(F) and tausub(F) on solvent and on isotopic substitution (OH implies OD). A mechanism involving specific deactivation of the fluorescent state from a hydrogen bonded complex is proposed to rationalize the data. (Atomindex citation 09:385641)

AED-Conf-77-407-012 PC **A02**/MF **A01**
Technische Hochschule, Darmstadt (Germany, F.R.). Fachbereich Anorganische Chemie und Kernchemie.
Laser Induced Isotope Exchange Reactions of Chlorine Atoms in the Gas Phase.
K. H. Lieser. 1977, 3p CONF-771188-1
In German.Lecture meeting of the GDCh-Fachgruppe Photochemie, Konstanz, F.R. Germany, 17 Nov 1977.
U.S. Sales Only.

A brief survey is presented of laser induced selective isotope exchange in general, the preconditions for these reactions, and the results with dichloro- up to tetrachloroethane. (Atomindex citation 09:385632)

AED-Conf-77-535-001 PC **A02**/MF **A01**
Max-Planck-Institut fuer Metallforschung, Stuttgart (Germany F.R.). Labor fuer Reinststoffe.
Analytical Characterization of High-Purity Metals - Present State and Trends.
G. Toelg. 1977, 23p CONF-7711105-1
In German.Symposium on impurities in metals, Bad Nauheim, F.R. Germany, 3 Nov 1977.
U.S. Sales Only.

The first part of this survey deals with the systematic errors of the analysis processes which gain importance with decreasing concentration and whose principal causes and indentification is investigated here. The second part takes a look at how to obtain not only reproducible but also correct results, by means of a few examples of extrem metal trace analysis. In all new analysis methods presented, optimized fusion and separation methods are combined with correspondingly strong detection determination methods for isolated element traces in such a manner that only minimal methodical errors can still occur. Dust-free laboratories, chemically extensively inert materials for the necessary apparatus, highly pure reagents and special microtechniques are further important preconditons in order to systematically limit errors. To prove the correctness of data in extreme trace analysis, there should be at least two independent methods available in all process steps. One must thus realize that the use of multielement methods more economical in instrumental routine analysis (e.g. mass spectrometry, instrumental activation analysis, X-ray fluorescent analysis) necessitates accurate standard reference samples which generally may only be reliably obtained via the multistage compound method dealt with here. (Atomindex citation 09:397469)

AED-Conf-77-537-001 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Production and Properties of a Fe sub 2 O sub 3 -Aerosol That Can Be Radioactively Labelled.
W. Stahlhofen, J. Gebhart, J. Header, and G. Stuck. 1977, 7p CONF-7710173-1
In German.Meeting on aerosols in natural science, medicine and technology-measurement techniques and technical application, Karlsruhe, F.R. Germany, 26 Oct 1977.
U.S. Sales Only.

To produce a solid aerosol from Fe sub 2 O sub 3 particles, an aqueous colloidal solution of Fe sub 2 O sub 3 is atomized using a spinning-top generator, and the resulting mist is dried. The aerosol is radioactively labelled with an exp 198 Au colloid. Size, size distribution, concentration shape, and density of the Fe sub 2 O sub 3 particles are determined and their solubility in water and blood ultrafiltrate is investigated. (Atomindex citation 09:385726)

BCRA-55 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Use of Vacuum Microsublimation and a TLC Plate Fluorescence Scanner in the Determination of Benzo(A)Pyrene.
Oct 78, 19p
U.S. Sales Only.

The study of analytical methods in relation to coking-plant atmospheric pollutants and other related industrial situations was continued. A thin layer chromatographic plate fluorescence scanner was applied to the determination of

benzo(a)pyrene. The technique of vacuum microsublimation was used for the preliminary extraction of samples prior to final analysis. The extraction of atmospheric particulate deposits collected on glass-fiber or silver-membrane filters by vacuum microsublimation is compatible with the quantification of BaP using a thin layer chromatogram fluorescence scanner. This improved method of BaP determination is both less time-consuming and more sensitive than the existing procedure. (ERA citation 05:022740)

CBPF-A0011/78 PC **A02**/MF **A01**
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Generalized Bond Percolation and Statistical Mechanics.
C. Tsallis. May 78, 25p
U.S. Sales Only.

A generalization of traditional bond percolation is performed, in the sense that bonds have now the possibility of partially transmitting the information (a fact which leads to the concept of 'fidelity' of the bond), and also in the sense that, besides the normal tendency to equiprobability, the bonds are allowed to substantially change the information. Furthermore the fidelity is allowed, to become an aleatory variable, and the operational rules concerning the associated distribution laws are determined. Thermally quenched random bonds and the whole body of Statistical Mechanics become particular cases of this formalism, which is in general adapted to the treatment of all problems whose main characteristic is to preserve a part of the information through a long path or array (critical phenomena, regime changements, thermal random models, etc). Operationally it provides a quick method for the calculation of the equivalent probability of complex clusters within the traditional bond percolation problem. (Atomindex citation 10:438654)

CEA-CONF-3954 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Service de Chimie-Physique.
Nozzle Beam Techniques.
R. Campargue. 1977, 5p CONF-770435-
International symposium on molecular beams, Noordwijkerkout, Netherlands, 18 Apr 1977.
U.S. Sales Only.

The high performance achieved in the field of molecular beam production thanks to nozzle beam techniques is described. The production of condensed molecular beams is shown to be of great interest. Heated nozzles can produce jets and beams with vibrational excited states and even population inversions. In the other hand low rotational temperatures are attainable even for heavy polyatomic molecule and this has led to the new method called 'molecular-jet-spectroscopy'. (Atomindex citation 09:392792)

CEA-CONF-4320 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Recherche et Analyse.
Continuous Gas Dosage in Nuclear Industry. Techniques and Prospects.
E. Roth. 1978, 6p CONF-7804156-1
In French.Colloquium on continuous gas analysis and detectin elements improvements, Saint-Etienne, France, 19 Apr 1978.
U.S. Sales Only.

Continuous gas analysis effected or forseen in raw materials used for energy production by nuclear fuels is described. Are examined more particularly: process gas control, i.e. verification in each part of a workshop that it works properly; quality control of auxiliary fluids, i.e. coolants, ventilation; gaseous effluents control; special applications; finally radioactivity control, in particular, wastes supervision. (Atomindex citation 10:471015)

CEGB-RD/B/N-4357 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Measurement of Oxygen Thermomigration in a Hypostoichiometric Mixed Oxide.
D. I. R. Norris, S. C. Coleman, and P. Kay. Aug 78, 20p
U.S. Sales Only.

A method of determining oxygen to metal ratios in hypostoichiometric (U, Ce)Osub(2-x) by means of lattice parameter measurement and its application to thermomigration experiments is described. The technique is shown to compare favourably with other methods when a simple structure prevails. It is found that oxygen redistributes down an imposed temperature gradient, confirming theoretical predictions, and that the measured Arrhenius slope decreases as the cerium valency decreases. This effect is more marked than in (U, Pu)Osub(2-x). The results are attributable to solid state transport of oxygen vacancies and suggest that immobile complexes incorporating some oxygen deficiency are more easily formed in (U, Ce)Osub(2-x) than in (U, Pu)Osub. (Atomindex citation 10:429861)

CNEA-413 PC **A02**/MF **A01**
Comision Nacional de Energia Atomica, Buenos Aires (Argentina).
Activation Analysis of Thallium in Urine Using the exp 203 Tl(N,2N) exp 202 Tl Reaction.
R. O. Korob, I. M. Cohen, M. Lage, and G. B. Baro. Apr 76, 8p
In Spanish.
U.S. Sales Only.

The method developed by the authors of thallium determination in human urine, based on the exp 203 Tl(n,2n) exp 202 Tl reaction followed by chemical separation and measurement of the produced exp 202 Tl by gamma spectrometry, is described. Its application in some cases of intoxication by thallium is reported. The advantages and limitations of the described technique are discussed. (Atomindex citation 10:422846)

CRN-CNPA-77-22 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Chemistry of Positronium. Part VI: Inhibition and Enhancement of Positronium Formation in Aqueous Solutions of Halides, Sulfide and Thiocyanate.
G. Duplatre, J. C. Abbe, A. G. Maddock, and A. Haessler. 1977, 8p
U.S. Sales Only.

The formation of positronium in aqueous solutions of halides, sulfide and thiocyanate has been investigated. Inhibiting and enhancing reactions of positronium formation are found. The results are discussed in terms of the spur model. (Atomindex citation 09:416795)

DESY-SR-79/09 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Quantitative Structural Studies by Means of the Energy-Dispersive Method with X-Rays from a Storage Ring.
B. Buras, L. Gerward, A. M. Glazer, M. Hidaka, and J. S. Olsen. Jun 79, 13p
U.S. Sales Only.

Test experiments were made using the X-ray energy-dispersive method at the storage ring DORIS (Hamburg) working in the single-bunch mode. It is shown that the spectral distribution of the incident beam calculated from the storage-ring parameters is in very good agreement with that derived from measured diffraction patterns of known substances, and thus it can be used for structural studies. This is illustrated with results of profile-fitting refinement applied to urea and naphthalene. It is also shown that because of an improved detector system and the time structure of the radiation emitted from the storage ring one is able to record 7.10 exp 4 photons per second and obtain reliable patterns in times of the order of 1 s. (Atomindex citation 11:503526)

DOE/ER/06036-3 PC **A04**/MF **A01**
Texas A and M Univ., College Station. Dept. of Chemistry.
X-Ray Emission in Heavy-Ion Collisions. Progress Report, April 1, 1979-March 31, 1980.
R. L. Watson. Apr 80, 51p
Contract AS05-78ER06036

Recent research in the cyclotron institute and department of chemistry at Texas A and M University on the x-ray emission in heavy-ion collisions is described. Areas covered include: spectra of Ka x-rays from 64 MeV sulfur ions traveling in solids; foil-excited Ka x-ray transitions in few-electron sulfur ions; high-resolution study of the target thickness dependence of x-ray emission from 65 MeV sulfur ions; dynamic screening of highly stripped sulfur ions in solids; Mg Ka x-ray satellites excited by ion bombardment, multiplet structure and dependence on projectile and chemical environment; angular distributions of beam and target Ka x-rays; chemical effects on K x-ray satellites of fluorine compounds; and a non-linear least-squares peak-fitting program employing Voight functions. (ERA citation 05:024805)

DOE/ER/10512-T1 PC **A03**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Physics and Astronomy.
Differential Charge Transfer to the Continuum by Ions in Atomic Hydrogen. Progress Report and Renewal Proposal.
I. Sellin, and R. S. Thoe. 1980, 26p
Contract AS05-79ER10512

It has been found, in measurements of fully stripped ions on rare gas targets, that current theories of electron capture to continuum states in hydrogenic approximation give a different projectile Z dependence from that observed experimentally. It is therefore proposed to study the projectile Z, velocity, angular, and charge state dependence of charge exchange to continuum states for H exp + , C exp 6+ , and O exp 8+ ions on atomic hydrogen. The previously obtained results are discussed by way of background. Some technical details concerning work done in connection with the proposed experiment are given. An exploratory spectrum of continuum capture electrons from 234-MeV Ar exp 18+ on H sub 2 is shown. 7 figures. (ERA citation 05:024819)

DOE/EV/03221-66 PC **A02**/MF **A01**
Israel Inst. for Biological Research, Nes Ziyyona.
Iron Hexacyanide/Cytochrome-C - Intramolecular Electron Transfer and Binding Constants - (Pulse Radiolytic Study). Progress Report.
Y. Ilan, and A. Shafferman. 12p
Contract AC02-76EV03221

Internal oxidation and reduction rates of horse cytochrome-c in the complexes, CII.Fe/sup III/(CN) exp -36 and CIII.Fe/sup II/(CN) exp -46 , are 4.6.10 exp 4 s exp -1 and 3.3.10 exp 2 s exp -1 , respectively. The binding sites of the iron hexacyanide ions on either CII or CIII are kinetically almost indistinguishable; binding constants range from 0.87.10 exp 3 to 2.10 exp 3 M exp -1 . The present pulse radiolytic kinetic data are compared with that from N.M.R, T-jump and equilibrium dialysis studies. (ERA citation 05:024504)

ESDU-80005 PC**$26.50**
Engineering Sciences Data Unit Ltd., London (England).
Surface Tension of Water.
Data item.
c1980, 2p ISBN-0-85679-289-6
Also pub. as ISSN-0141-4062, and ISSN-0141-4070.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

This document provides an equation for the surface tension of water that are in agreement with the current International Formulation. Typical applications are in heat transfer and fluid flow calculations in the design of chemical plant and steam turbines, boilers, and other mechanical engineering equipment. The range of applicability are the temperatures from triple point to critical point along saturation line.

EUR-CEA-FC-963 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Investigation of the Structure of the He l 4 exp 3 D, exp 3 F-2 exp 3 P (lambda=447.15 NM, lambda=447.0 NM) Spectral Line Emitted from a Low Pressure Plasma.
H. W. Drawin, and J. Ramette. Jul 78, 41p

U.S. Sales Only.

Measurements of the line profile of the HeI line at lambda=4471 A during the ionization phase and the afterglow of a helium plasma are reported. The report contains a detailed description of the experimental apparatus and the performance of the 10-channel spectrum analyzer used for these investigations. The measurements showed a complicated peak structure superposed on the time-resolved Stark-broadened profile of the helium atomic line. The wavelength positions of the individual peaks did not change with electron density. It is concluded from the measurements that the peak structure originates from He sub 2 molecular lines. The formation of Baranger-Mozer plasma satellites has to be excluded under the experimental conditions. During the ionization phase a non-thermal excitation of the n=4 sublevels was observed. This effect is important in connection with the determination of electron density and/or of Doppler temperature from this spectral line, since the line width becomes a function of the degree of non-thermal excitation of the sublevels. (Atomindex citation 10:471630)

FIAS-R-26 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Ionization of Atomic Hydrogen: Angular Correlations of the Outgoing Electrons.
E. Weigold, S. T. Hood, I. Fuss, and A. J. Dixon.
Jul 77, 12p
U.S. Sales Only.

The angular correlations of the 'scattered' (186.4eV) and 'ejected' (50eV) electrons have been measured for the ionization of hydrogen atoms by 250eV incident electrons. The shape of the five-fold differential cross-section is in poor agreement with Born and plane-wave Born approximation calculations. The Coulomb-projected Born approximation calculations of Geltman and Hidalgo appear to give improved agreement where they can be compared with the present results. (Atomindex citation 10:438830)

FRNC-TH-722 PC **A06**/MF **A01**
Paris-6 Univ., 75 (France).
Study of the Dissolution Velocity of Dispersed Solid Particles. Development of a Calculation Method for Analyzing the Kinetic Curves. Extension to the Study of Composed Kinetics.
M. Jorda. 1976, 105p
In French.Thesis.
U.S. Sales Only.

The dissolution of a solid in an aqueous phase is studied, the solid consisting of dispersed particles. A continuous colorimetric analysis method is developed to study the dissolution process and a two-parameter optimization method is established to investigate the kinetic curves obtained. This method is based on the differential equation dx/dt=K(1-x)sup(n). (n being the decrease in the dissolution velocity when the dissolved part increases and K a velocity parameter). The dissolution of SO sub 4 Cu and MnO sub 4 K in water and UO sub 3 in SO sub 4 H sub 2 is discussed. It is shown that the dissolution velocity of UO sub 3 is proportional to the concentration of the H exp + ions in the solution as far as this one is not higher than 0.25N. The study of the temperature dependence of the UO sub 3 dissolution reaction shows that a transition phase takes place from 25 to 65 exp 0 C between a phase in which the dissolution is controlled by the diffusion of the H exp + ions and the chemical reaction at the interface and a phase in which the kinetics is only controlled by the diffusion. (Atomindex citation 09:407073)

FRNC-TH-805 PC **A06**/MF **A01**
Paris-6 Univ. (France).
Study of the Collisional Destruction of Neutral Hydrogen Atoms in the Ground State H(1 exp 2 S) and in the Metastable State H(2 exp 2 S) on Different Rare Gas Targets in the 0.5 to 3.0 KeV Energy Range.
F. Roussel. 1978, 120p
In French.These (D. es S.).
U.S. Sales Only.

The total destruction cross-sections of H(2 exp 2 S) on rare gases and hydrogen are studied in the energy range 50 to 3000 eV, and the electron loss and electron capture cross-sections from H(1 exp 2 S) and H(2 exp 2 S), in the energy range 0.5 to 3 keV. The de-excitation cross-sections are deduced. (Atomindex citation 11:503476)

FRNC-TH-854 PC **A04**/MF **A01**
Paris-11 Univ., Orsay (France).
Study of the Elastic Scattering Differential Cross Sections of a Proton Beam by a Cesium Target.
M. El Maddarsi. 1978, 54p
In French.These (3e Cycle).
U.S. Sales Only.

The elastic differential cross section of H exp + on Cs is studied experimentally and theoretically. The experimental device is described, after which the differential cross-section values obtained as a function of the laboratory angle are given for four incident energies: 13.4 eV, 15.1 eV, 17.7 eV and 24.2 eV. By means of an interaction potential of the quasi-molecule H exp + Cs the differential cross sections are calculated for the same incident energies; this calculation uses the semi-classical method of stationary phases, which shows clearly the limits of conventional description and the changes introduced by quantum effects. Very good agreement is obtained between theoretical and experimental results, which shows that elastic scattering is very little perturbed by inelastic channels in this energy range. The estimated inelastic cross section at 24 eV is about 1.9 X 10 exp -15 cm exp 2 , corresponding to 1.6% of the scattering process. (Atomindex citation 11:503425)

IAE-2524 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Program for Calculation of Energy Levels and Wave Function of the Particle Discrete Spectrum with a 1/2 Spin in a Central Field. The Dirac Equation.
A. A. Soldatov. 1975, 13p
In Russian.
U.S. Sales Only.

A program is presented to calculate particle energies and wave function tables for particles with a spin of 1/2 in an arbitrary central field at given quantum numbers n, l, j (n = principal quantum number, l = orbital moment, j = full moment). The Dirac equation is used as a wave equation. A possibility for the variation of the radial wave function tabulation method has been incorporated. The count time shows but a slight dependence on the selection of the initial point for energy. The interrelation between program operating time and energy accuracy value is such, that with the rational wave function table form selection it is possible to achieve an accuracy of 10 exp -9 for a time of about 1 second. A possibility is seen for predicting normalized wave functions at a known energy level. (Atomindex citation 10:421693)

IAE-2773 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Accumulation of Radiation Defects in Peptides.
A. F. Usatyi, and V. I. Panin. 1977, 27p
In Russian.
U.S. Sales Only. Microfiche copies only.

EPR and NMR evidence on the mechanism of accumulation of gamma -irradiation induced defects in molecules has been obtained. Free radicals resulting from the initial radiation-chemical process take part in secondary radical reactions. Data on limiting concentrations of paramagnetic centres appearing by irradiation by particles with different ionization loss values and spur parameters can be helpful for solving problems connected with the effect of large irradiation doses on materials and with the efficiency of radiation destruction of low molecular and polymer compounds. (Atomindex citation 10:420465)

IEA-DT-036 PC **A05**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Study on the Determination of Uranium by Activation Analysis with Epithermal Neutrons.
L. T. Atalla. Dec 77, 90p
In Portuguese.
U.S. Sales Only.

A method is described that is applied to the determination of uranium in different types of materials, either by an entirely instrumental method or with the chemical separation of uranium-239, when the presence of interferences does not allow the instrumental analysis. The advantages and disadvantages in the use of epithermal neutrons in the activation of samples for a more selective activation of uranium-238 also presented. The instrumental method is tested through standart materials, accepted internationally. The possibility of uranium extraction with di-ehl-hexylphosphoric acid is also presented and the choice of the former technique is justified. The sensitibility of the method is discussed as well as precision and accuracy through results obtained in the analysis of the standards and the calibration curve of uranium. (Atomindex citation 10:432183)

IEA-DT-038 PC **A03**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Addition Compounds of Yttrium and Lanthanide Perrhenates with Tetramethylene Sulphoxide.
K. Umeda. Dec 77, 50p
In Portuguese.Thesis.
U.S. Sales Only.

Adducts of lanthanide perrhenates with tetramethylene sulfoxide are prepared and characterized. The compounds having as general formula Ln(Re04) sub 3 .7.5 TMSO(ln=La-Lu and Y) are characterized by elemental analysis, infrared spectra, molar conductance measurements, x-ray powder patterns, differential scanning calorimetry curves, melting temperature range measurements and thermogravimetric analysis. (Atomindex citation 09:416647)

IEA-DT-042 PC **A04**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Determination of O/U Ratio in Uranium Oxides Using Activation Analysis of Oxygen with 14 MeV Neutrons.
E. L. Machado. Jan 78, 71p
In Portuguese.Thesis.
U.S. Sales Only.

Activation analysis using 14 MeV neutrons for determination of O/U ratio is presented. Sample are pneumatically transfered from irradiated and counting places, with 10 m apart. A Ge (Li), 35cm exp 3 coupled with a multichannel analiser is used for counting of exp 16 N of the sample. (Atomindex citation 09:413691)

IEA-DT-140 PC **A03**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Dynamic Separation of Szilard-Chalmers Reaction Products Applied to the Trioxalatochromium Ion Adsorbed on Anionic Exchange Resin.
Tese (M.Sc.),
J. B. S. Silva. Feb 79, 34p
In Portuguese.
U.S. Sales Only.

A method of dynamic elution of recoiled exp 51 Cr exp +3 , formed by the Szilard-Chalmers reaction during the irradiation of trioxalatochromium ion adsorbed on anionic exchange resin is presented. The influence of some factors on the separation yield of chromium-51, such as: composition, concentration and flow rate of eluent, mesh size of the resin and irradiation time are studied. The results are compared with those obtained by the static method, in which the recoiled atom is separated from the target after irradiation. Because of the high separation yield of chromium-51, the method of dynamic separation is proposed for routine production of this element, with high specific activities. (Atomindex citation 11:496345)

IEA-499 MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Div. de Engenharia Quimica.
Spectrographic Analysis of Aluminum for Minor Alloying and Impurity Elements Employing an AC Arc Excitation.
L. C. Chandola, J. de Brito, R. P. Gomes, and A. R. Lordello. Jan 78, 20p
U.S. Sales Only. Microfiche copies only.

The AC arc excitation is employed for the determination of B, Cu, Fe, Mg, Mn, Si and Ti in aluminum oxide in the concentration range 0.025 - 1%. The

aluminum metal is converted to oxide an glued to the flat tops of a pair of graphite electrodes without any further treatment. The standards are prepared synthetically on pure aluminum oxide by dry-mixing. Spectra are recorded on Kodak SA-1 plate using the first order of a 15,000 lines per inch grating. Each spectrum is obtained in two steps of 100% and 18% transmission with the help of a neutral filter. One aluminum line is used as internal standard. The precision of the method varies from +- 4% for B to +-17% for Cu. (Atomindex citation 09:416570)

IJS-106/5004-77 PC **A03**/MF **A01**
Institut Jozef Stefan, Ljubljana (Yugoslavia).
Study of the Possibilities for the Processing and Exploitation of Nuclear Raw Materials.
A. Smalc. 1977, 46p
In Slovenian.
U.S. Sales Only.

Laboratory scale fluorinations of uranium tetrafluoride with elemental fluorine under pressure and the reactions of uranium hexafluoride with boron trioxide and sulphur are described. A review of the reactions with UF sub 6 and the processes for the conversion of UF sub 6 into non-volatile uranium compounds is given. (Atomindex citation 10:423043)

INIS-mf-4118 MF **A01**
Universidade Federal do Rio de Janeiro (Brazil). Coordenacao dos Programmas de Posgraduacao de Engenkharia.
Influence of the Diluent on the Radiolytic Degradation of TBP in TBP Systems, 30% (V/V) - Diluent-Nitric Acid.
M. N. Rubenich. Mar 76, 144p
In Portuguese.Thesis.
U.S. Sales Only. Microfiche copies only.

The influence of the diluent on the degradation of TBP was studied by a gas chromatographic technique. The results obtained have shown that the aromatic diluents decrease markedly the HDBP production in the radiolysis of TBP, while n-dodecane, which is being used as diluent, promotes this radiolysis. However, the influence of the diluent becomes not too significant on the total (radiolysis + hydrolysis) solutions containing nitric acid. In view of foreseeing applications of aromatic diluents or their mixtures with aliphatic diluents on nuclear fuel reprocessing, it would be advisable to carry out more research on the system TBP/diluent, particularly on the kinetics of the hydrolysis of TBP and the influence of the diluent on the TBP degradation under conditions similar to those verified in the Purex Process. (Atomindex citation 09:365111)

INIS-mf-4291 PC **A08**/MF **A01**
Amsterdam Univ. (Netherlands).
Properties of Solid Molecular Hydrogens as a Function of Density and Ortho-Para Concentration as Studied by Raman Scattering.
P. J. Berkhout. 5 Apr 78, 153p
Proefschrift (Dr.).
U.S. Sales Only.

The results of Raman scattering experiments on solid molecular hydrogens as a function of density and ortho-para concentration are presented. The Raman scattering spectra of double rotational transitions are discussed. These spectra are taken as a function of ortho-para concentration in zero pressure H sub 2 and as a function of density in both H sub 2 and D sub 2 up to 5000 atm. at the melting line. Double rotational transitions are also observed in the liquid phases of H sub 2 and D sub 2 at zero pressure. Measurements of the density dependence in H sub 2 and D sub 2 and the isochoric temperature dependence of these frequencies are discussed. The dependence on the ortho-para concentrations of several libron properties is given. (Atomindex citation 09:384303)

INIS-mf-4299 PC **A02**/MF **A01**
Instituto de Pesquisas Radioativas, Belo Horizonte (Brazil).
Binding Energy and Formation Heat of UO sub 2.
M. R. de Almeida, J. T. Veado, and M. L. de Siqueira. 20p CONF-7306136-1
In Portuguese.28. annual congress of the Brazilian Association of Metals, Salvador, Bahia, Brazil, 24 Jun 1973.
U.S. Sales Only.

The Born-Haber cycle is utilized for the calculation of the heat of formation of UO sub 2 , on the assumption that the binding energy is predominantly ionic in character. The ionization potentials of U and the repulsion energy are two critical values that influence calculations. Calculations of the ionization potentials with non-relativistic Hartree-Fock-Gaspar-Kohn-Sham approximation are presented. (Atomindex citation 09:385956)

INIS-mf-4300 PC **A06**/MF **A01**
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Study by Electronic Paramagnetic Resonance of the Ni(CN) Sub 4 K sub 2 Irradiated with Electrons in KCl E NaCl.
S. I. Zanette. 1975, 116p
In Portuguese.Thesis.
U.S. Sales Only.

The Ni(CN) sub 4 K sub 2 irradiated with electrons in KCl and NaCl is studied by electronic paramagnetic resonance. The validity of two approximations, is tested with one, of intermediate symmetry and the other one of super-hyperfine structure to evaluate the coefficients of the ligants in the molecular orbital. (Atomindex citation 09:384716)

INIS-mf-4459 PC **A04**/MF **A01**
Institut za Nuklearne Nauke Boris Kidric, Belgrade (Yugoslavia).
Application of Radioactivation Analysis for Determination of Impurities in Aluminium, Raw Materials and in Samples from Aluminium Production Process.
Thesis (PH.D.),
L. J. Vucina. 1977, 60p
In Serbian.
U.S. Sales Only.

Trace elements in aluminium, raw materials and in the samples from different stages of aluminium production were determined by nondestructive neutron radioactivation analysis. The samples were taken from the Bayer's process of alumina production (bauxite, red sludge and alumina), from the components of the reduction cell (anode, cryolyte and AlF sub 3) and of the final product - aluminium (purity 99.5-99.7%). Under given set of conditions ten trace elements (V,La,Ga,Mn,Co,Cr,Sc,Sb,Zn and Fe) were determined in aluminium and followed through the production process. It was found that the main impurities in aluminium are iron (0.15%) and zinc (0.O6%). It has been concluded that the purity of produced aluminium depends mainly on the purity of used alumina. The second important source of contamination of aluminium is anode. The results obtained by radioactivation analysis for V, Mn, Cr and Fe fall within the ranges of concentrations of these elements determined by use of other methods (volumetry, spectrophotometry, atomic absorption). Higher values for zinc were obtained by radioactivation analysis, probably due to unsatisfactory irradiation and measuring conditions for this element. The possibilities of application of radioactivation analysis to these kinds of samples are also disscused. (Atomindex citation 09:416652)

INIS-mf-4559 PC **A07**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Molecular Structure and Nonequilibrium Polarizations: Recent Experiments on Polar Gases.
B. J. Thijsse. 1978, 144p
Proefschrift (Dr.).
U.S. Sales Only.

Senftleben-Beenakker experiments are reported on the thermal conductivity and visosity of polyatomic gases. Polar molecules of linear and symmetric top structure have been investigated in a magnetic field. NH sub 3 -noble gas mixtures and CH sub 3 CN mixtures have been studied. The results indicate the concentration dependence of the various non-equilibrium polarizations for these specific systems. (Atomindex citation 10:419512)

INIS-mf-4561 PC **A07**/MF **A01**
Vrije Univ., Amsterdam (Netherlands).
Collisional Broadening in the Rotation Spectrum of Methyl Fluoride.
E. Elenbaas. 1978, 131p
In Dutch.Proefschrift (Dr.).
U.S. Sales Only.

This thesis investigates the pure rotation spectrum of methyl fluoride, especially with regards to the experimental behaviour of the line width as a function of the line number. The spectrum was determined over a wide range of frequencies, enabling 35 rotational transitions to be analysed separately. The total program of measurements consisted of four series in pure CH sub 3 F and in a number of mixtures with helium, as a function of temperature and pressure. The temperature was varied between 0 and 100 exp 0 C, the pressure between 0 and 3 atm. The analysis of the measurements indicates that the maximum in the line width is caused by resonance collisions. The experimental data are compared with a number of the available theories of the causes of line broadening. (Atomindex citation 10:419497)

INIS-mf-4753 PC **A08**/MF **A01**
Weston Geophysical Research, Inc., MA.
Atomic Energy Technical Data Sheets. Properties of Substances in SI Units.
1974, 92p
U.S. Sales Only.

A compendium of loose-leaf data sheets has been produced to provide information for design engineers and scientists in the nuclear fields, in the properties of gases, liquids, and solids which are of particular interest. Part 1 comprises the physical properties (density, viscosity; saturation pressure, specific heat and thermal conductivity) of gases, i.e. air, C0 sub 2 , He, H sub 2 , N sub 2 , 0 sub 2 and steam. Part II gives the physical properties of the following liquids: HN0 sub 3 , odourless kerosene, Pu, Na, tributyl phosphate, uranyl nitrate, heavy and light water. Part III includes the physical properties (density, m.p. specific heat, thermal conductivity, electrical conductivity and resistivity) and also mechanical properties of solids, e.i. Al, Cu, Pb, Pu, Na, steels, U, Zr and alloys, graphite, and several thermal insulants. The data is presented in the form of graphs, with formalae, and some tables. Methods of derivation of the data are indicated and references are included. (Atomindex citation 10:432833)

INIS-mf-5334 MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Study of Nuclear Relaxation to the Electron Non-Zeeman System.
J. van Honten. 6 Jun 79, 117p
U.S. Sales Only. Microfiche copies only.

An examination of the nuclear spin-lattice relaxation mechanism in a series of diluted copper-caesium Tutton salt crystals, containing different percentages of D sub 2 O in the waters of hydration, is described. Results of relaxation measurements are presented and a strong angular dependence is observed. It is proved, however, that under most experimental conditions applied, the bottleneck in the relaxation path is not the cross-relaxation but the thermal contact between the proton Zeeman system and the electron dipole-dipole interaction system. Hence the proton spin-lattice relaxation measurements have enabled determination of the time constant of this thermal contact. The microscopic coupling process which provides thermal contact, is a simultaneous transition of two electron spins and one proton spin. This so-called three-spin transition is described and calculations presented. Double resonance experiments are performed, where the resonance signal of deuterium or caesium spins is saturated and the effect on the proton resonance signal observed. (Atomindex citation 11:495505)

INIS-mf-5335 PC **A04**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Excited States of a Number of Saturated Cyclic Hydrocarbons Due to Irradiation of the Liquid Phases with High Energy Radiation.
H. D. K. Codee. 7 Jun 79, 72p
In Dutch.
U.S. Sales Only.

An investigation has been carried out into the quenching of the excited states of liquid saturated hydrocarbons following irradiation with high-energy radiation. The time dependence of the specific rate of reaction of the solvent excited state

with quenchers, the reaction radius and the sum of the diffusion coefficients of the reacting species are determined. The time dependence of the fluorescence intensity resulting from irradiation with a short pulse of high-energy electrons was investigated and the total fluorescence yield was studied. The processes are considered, the experimental method described and the results presented. (Atomindex citation 11:495431)

INIS-mf-5338 PC **A07**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Separable Many-Particle Interactions and Stability of Critical Behaviour.
L. W. J. den Ouden. 20 Jun 79, 142p
U.S. Sales Only.

An important problem in statistical mechanics is the evaluation of thermodynamic properties of a many-body system containing a large number (N) of particles on the basis of microscopic interactions between the particles. These properties may depend in a rather sensitive way on the range of interaction between the particles. In many cases it is sufficient to evaluate the free energy per particle from which other thermodynamic quantities can be derived. A rigorous derivation of the free energy for systems with separable many-particle interactions is presented. A rather general treatment on the critical properties of the free energy in the neighborhood of a critical point of the short-range reference system is given. The conclusions are made more explicit for the special case under perturbations involving two relevant variables, using the linear model introduced by Schofield to describe the reference free energy in the neighborhood of a simple critical point with two relevant variables and divergent second derivatives such as, e.g., the critical point of the three-dimensional Ising model. (Atomindex citation 11:495395)

INIS-mf-5339 MF **A01**
Utrecht Rijksuniversiteit (Netherlands).
Sputtering and Scattering by Interaction of Low Energy Noble Gas Ions with Monocrystalline Metal Surfaces.
A. van Veen. 19 Jun 79, 177p
U.S. Sales Only. Microfiche copies only.

Sputtering and scattering processes in monocrystalline metal surfaces caused by low-energy ion bombardment are described. Three aspects of the sputtering process have been studied: (i) the phenomenon of sputtering in preferential directions, (ii) the dependence of sputtering on the projectile target atom mass ratio, and (iii) the transition in sputtering with increasing projectile energy from being a process dominated by multiple collisions in the surface, at the threshold energy, to a process dominated by collision cascades below the surface, at higher energy. The experiments deal with sputtering in the low energy region (projectile energy from 20 to 1000 eV); the projectile ions Ne exp + , Ar exp + , Kr exp + , Xe exp + were perpendicularly incident on fcc (100) and fcc (110) Cu, Ag and Au surfaces. Evidence is found for a sputtering process in which light ions reflecting from sub-surface atoms cause the ejection of surface atoms by hitting them from below. (Atomindex citation 11:495566)

INIS-mf-5342 PC **A05**/MF **A01**
Utrecht Rijksuniversiteit (Netherlands).
Long-Range Carbon-Proton Spin-Spin Coupling Constants in Conformational Analysis.
T. Spoormaker. 11 Jun 79, 89p
U.S. Sales Only.

The author has collected a reliable set of data on long-range exp 13 C- exp 1 H coupling constants in aliphatic compounds and developed the use of long-range exp 13 C- exp 1 H coupling constants as a tool in the conformational analysis of aliphatic compounds. An empirical determination of the torsion angle dependence of the vicinal exp 13 C- exp 1 H coupling constant for model compounds is described, and the dependence of long-range exp 13 C- exp 1 H coupling constants on the electronegativity of substituents attached to the coupling pathway, reported for the monohalogen substituted ethanes and propanes. The electronegativity dependence of the vicinal exp 13 C- exp 1 H coupling was studied in monosubstituted propanes whose substituents are elements from the first row of the periodic table, and it is shown that the vicinal exp 13 C- exp 1 H coupling constant in aliphatic systems is a constitutive property. The geminal exp 13 C- exp 1 H coupling constants in ethyl, isopropyl and tert-butyl compounds, which have been substituted by an element of the first row of the periodic table or a haline atom, are reported, and the influence of electronegative substituents on the vicinal exp 13 C- exp 1 H coupling constants in the individual rotamers of exp 13 CH sub 3 -C(X)H-C(Y)H- exp 1 H fragments is discussed. The application of long range exp 13 C- exp 1 H coupling constants to the conformational analysis of CMP-N-Acetylneuraminic acid and 2,6-dichloro-1,4-oxathiane is described. (Atomindex citation 11:495458)

INIS-mf-5352 PC **A07**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Hyperfine and Exchange Interactions in the M sub 2 CyX sub 4 . 2H sub 2 O Compounds.
W. J. Looyestijn. 2 May 79, 143p
U.S. Sales Only.

A study has been performed to determine the covalent admixtures of the electron orbitals via the measurement of the ligand super-hyperfine interactions and to relate the results to the super-exchange interaction. The subjects of this investigation are the ferromagnetic compounds with the M sub 2 CuX sub 4 .2H sub 2 O structure (where MX stands for KCl, NH sub 4 Cl, RbCl, CsCl, NH sub 4 Br and RbBr). A most important reason for selecting this series is that the (super)hyperfine interactions of all nuclei (including oxygen when exp 17 O enriched samples are used) can be measured using nuclear magnetic resonance techniques. The high site symmetries of most of the nuclei enable a rather accurate determination of these interactions. Moreover all these six isomorphous compounds contain the same magnetic ion so that the influence of the diamagnetic ligands on the super-exchange can be studied in particular. (Atomindex citation 11:495448)

INIS-mf-5355 PC **A05**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Spin-Lattice Relaxation in Phosphorescent Triplet State Molecules.
P. J. F. Verbeek. 14 Mar 79, 93p
U.S. Sales Only.

The present thesis contains the results of a study of spin-lattice relaxation (SLR) in the photo-excited triplet state of aromatic molecules, dissolved in a molecular host crystal. It appears that SLR in phosphorescent triplet state molecules often is related to the presence of so-called (pseudo) localized phonons in the molecular mixed crystals. These local phonons can be thought to correspond with vibrations (librations) of the guest molecule in the force field of the surrounding host molecules. Since the intermolecular forces are relatively weak, the frequencies corresponding with these vibrations are relatively low and usually are of the order of 10-30 cm exp -1 . (Atomindex citation 11:495461)

INIS-mf-5358 PC **A07**/MF **A01**
Bonn Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet.
Construction of a Two-Photon-Laser Spectrometer and Determination of the Hyperfine Splitting and Isotopic Shift of Barium.
W. Jitschin. 3 May 77, 128p
In German.
U.S. Sales Only.

A sensitive two-photon-laser spectrometer was constructed, that measures states with an energy from 31 000 up to 37500 cm exp -1 with about 2 MHz resolution. The large energy range and the high resolution were reached by using a wide-wavelength tunable, narrow-band dye-laser. With this spectrometer transitions could be detected at barium from the electron ground-state 6s exp 2 exp 1 S sub 0 to 10 upper states in the 5 most common isotopes exp 138 Ba, exp 137 Ba, exp 136 Ba, exp 135 Ba and exp 134 Ba. The transitions could be measured precisely. It was possible to derive lower limits of the life-time of these states from the widths of the recorded resonance lines (typically several nsec), that should in fact not be smaller than the actual lifetimes. From the measured hyper-fine splitting of the 6 transitions with angular momentum J = 2 at the oddnumbered isotopes exp 137 Ba and exp 135 Ba the parameters of the hyper-fine splitting could be determined. Hereby an accuracy of about IMH sub 2 could be reached at the A-factor and about 5MHz at the B-factor. At the measured transitions the isotopic shifts of the particular isotope could be determined with an accuracy of a few MHz. There was only a simple theory of the isotopic shift with only few parameters worked out for the theoretical interpretation of the measured data, that describes the data even at the experimentally reached high accuracy. Two parameters of this theory depending only from atomic nucleus properties, could be determined with a 0.5 % error. (Atomindex citation 11:495445)

INIS-mf-5368 MF **A01**
Pontificia Univ. Catolica do Rio de Janeiro (Brazil).
Calculation of the Electronic Structure Optical Transitions and Contact Hyperfine Parameters of Interstitial Hydrogen in Alkaline Halogen Crystals.
A. K. A. Maciel. Mar 77, 70p
In Portuguese.
U.S. Sales Only. Microfiche copies only.

The electronic structure of the interstitial hydrogen atom in KF, NaCl, KCl, and RbCl crystals has been studied using the self-consistent-field multiple-scattered X alpha method. In the present calculation a cluster constituted by the hydrogen atom surrounded by its first anion and cation neighbors in a cubic shell has been used. The optical transition energies and hyperfine contact parameters with the interstitial proton and the first shell nuclei have been evaluated. The agreement obtained with the experimental data and the relative independence of the method under variations of its intrinsic parameters, indicate that this method can be adequate to the study of defects in ionic cristals. (Atomindex citation 11:495525)

INIS-mf-5421 MF **A01**
Technische Hogeschool, Eindhoven (Netherlands).
Investigations on Afterglows of Neon Gas Discharges.
L. W. G. Steenhuysen. 11 May 79, 130p
Proefschrift (Dr.).
U.S. Sales Only. Microfiche copies only.

Experimental and numerical investigations on afterglows of neon gas discharges are described. The investigated pressure range extends from 0.5 torr to 100 torr; the discharge currents lie between about 1 mA and 100 mA. The decay of the 1s atom densities has been determined experimentally as function of the time elapsed in the afterglow. From the measured decay of metastable 1s sub 5 atom densities at gas pressure <= 5 torr the diffusion coefficient of metastable 1s sub 5 atoms as well as the coefficients of atomic collisional transfer between the 1s sub 5 and 1s sub 4 level are determined. To obtain more insight in the mutual influences of the various loss and production processes of 1s atoms and charge carriers in the afterglow a numerical model has been formed. The behavior of the afterglow radiation intensity has been measured on discharges with a gas pressure of 1, 10, 20, 50 and 100 torr and a discharge current of 22, 24 and 50 mA. From the results the recombination distribution fractions of the 1s levels are determined and the electron densities at the start of the afterglow of 20, 50 and 100 torr discharges. With the help of the selective excitation spectroscopy the coefficients of atomic transfer between the 2p levels have been measured in the afterglow of discharge with a gas pressure of 1, 10, 20, 50 and 100 torr and a discharge current of 22 mA. From these results and the measured intensities of the various spectral lines in the afterglow the partial recombination coefficients for the 2p levels are calculated. (Atomindex citation 11:500707)

INT-115/I PC **A02**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Surface Oxygen Effects in 14 MeV Neutron Activation Analysis of Oxygen in Metals.
J. Janczyszyn, K. Sztwiertnia, and S. Tarczanowski. 1976, 9p
In Polish.
U.S. Sales Only.

To examine possible ways of reduction of the signal originating from the sample surface, the

etching before and after activation and/or nitrogen transport were applied. The efficiency of post activation etching was confirmed. This procedure removes quantity of oxygen equivalent to 45 mu g/g for aluminium and 6 mu g/g for copper samples. The nitrogen transport without etching removes as much as 4 mu g/g in case of copper, however it turned out to be inefficient for aluminium samples. (Atomindex citation 10:422868)

IPNO-T-77-06 PC **A05**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Solvent Extraction of Pentavalent Elements (Pa, Ta, Nb) from Hydrochloric Media with Chlorooxine.
F. Vaezi-Nasr. 1977, 89p
In French.Thesis.
U.S. Sales Only.

Two problems are studied: the 5-7 dichloro 8 hydroxyquinoleine partition between the two phases system: CHCl sub 3 /HCl + LiCl, HClO sub 4 + HCl, mu =0.1 to 10, and the use of this reagent to extract the pentavalent elements Nb, Ta and Pa from the above aqueous medium. The following data have been obtained: the chelating agent HA gives ion pair H sub 2 AX (X=Cl ou ClO sub 4) in aqueous medium which are partially extracted when mu <6M. When mu =10, the element is extracted according to two mechanisms: chelating and ionic exchange. The ion pair formation constants were calculated from data giving the HA partition. The partition equilibrium corresponding to the Nb(V) et Pa(V) extraction for mu <6 has been established from distribution coefficient variations of exp 95 Nb and exp 233 Pa versus chloroxine H exp + and Cl exp - ion concentration. The ion thermodynamic activity influence which always raise some problems has been discussed. (Atomindex citation 09:407295)

IPP-9/31 PC **A06**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Oscillatory Ion Yields of He exp + Scattered from Atomic and Solid Pb-Targets.
A. Zartner. Aug 79, 119p
In German.
U.S. Sales Only.

Ion yields of He exp + scattered from atomic and solid Pb in the energy range from 200 to 2000 eV into a large scattering angle are reported. The beam results show an oscillatory structure of the ion yield as function of the energy which is comparable to the same effects observed for a solid target. Thus the atomic nature of the quasiresonant charge exchange is confirmed. The data also give evidence for solid-state effects influencing the oscillations of the ion yield. A theoretical model, describing the binary interaction between projectile and target atom by the formation of a quasimolecule, allows a more detailed interpretation of the experimental results. According to this model, the characteristic frequency of the oscillations is a consequence of the quasiresonant electron transfer between the Pb(5d) level and the He(1s) level, whereas the amplitudes depend essentially on the influence of the Auger-neutralisation processes. (Atomindex citation 11:503862)

Juel-1587 PC **A03**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung.
Synthesis and Superconductivity of Molybdenum Cluster Compounds (Chevrel Phase).
F. J. Culetto. May 79, 48p
In German.
U.S. Sales Only.

The discovery of superconductivity in ternary molybdenum sulfides (Chevrel phases) in 1972 has stimulated research on these compounds. Some of the phases show extremely high critical fields H/sub c2/ and might therefore find technical application as high-field superconductors. In order to understand the electron-phonon interaction in these substances, measurements of the superconducting isotope effect in exp 92-100 Mo sub 6 Se sub 8 , Mo sub 676-82 Se sub 8 , and exp 116-124 SnMo sub 6 S sub 8 have been performed. The corresponding isotope effect exponents beta (beta /sub mo/ = 0.27 +- 0.04, beta /sub Se/ = 0.27 +- 0.05 and beta /sub Sn/ <=0.05) have been calculated by fitting the experimental data to the relation TcM/sup beta / = const. We have shown that phonon modes connected with Se displacements as well as modes connected with Mo displacements couple to the conduction electron system in Mo sub 6 Se sub 8 . In case of the ternary Chevrel phase SnMo sub 6 S sub 8 , phonon modes connected with displacements of the Sn ions have only minor influence on the transition temperature. This result can be explained by the weak overlap of the molybdenum d/sub x exp 2 -y exp 2 / orbitals with Sn sites. Furthermore, we report experiments on the synthesis of new Chevrel phase materials. In order to optimize the valence electron concentration in some ternary molybdenum selenide compounds, chalcogen exchange reactions have been performed. A new Chevrel phase superconductor, Cu/sub x/Mo sub 6 S sub 6 I sub 2 with x = 0 - 1.2, has been synthesized by copper diffusion into the nonoccupied channels running between the Mo sub 6 S sub 6 I sub 2 'molecules' of Mo sub 6 S sub 6 I sub 2 . (Atomindex citation 11:503960)

JAERI-M-7899 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Irradiation Effects on the Reaction of Mixture of Carbon Monoxide and Hydrogen. II. Effects of Pressure Elevation and Gas Circulation.
S. Sugimoto, and M. Nishii. Oct 78, 60p
In Japanese.
U.S. Sales Only.

Following the previous report (JAERI-M 7898), the experimental results from Nov. 1976 to Mar. 1977 are described. Based on the previous results, an irradiation vessel of batch type was made to improve space time yield of the radiation chemical reaction of gas mixture of carbon monoxide and hydrogen. The stainless-steel vessel equipped with a titanium irradiation window 50 mu m thick can contain 2.7 liters of the mixture up to 10,000 Torr. Yields and G values of the products were determined under different reaction conditions such as pressures up to 6,300 Torr, composition from 8 to 50 mole % CO, and temperature of the gas mixture. The stainless-steel irradiation apparatus with circulating gas mixture is capable of determining yields of the products, with condensable products separated from the circulating gas mixture with cold traps to prevent their repeated irradiation. Variety of reaction conditions were examined, such as pressure up to 1,500 Torr, mixture composition and the presence or absence of cold traps. Information was also obtained on changes of the reactant composition and build-up of non-condensable products such as methane. (Atomindex citation 11:496377)

JAERI-M-7993 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Temperature Dependence of the Reaction of Hydrogen with Carbon Dioxide Induced by gamma-Rays.
H. Mitsui, and Y. Shimizu. Dec 78, 35p
In Japanese.
U.S. Sales Only.

A mixture of hydrogen (H sub 2) and carbon dioxide (CO sub 2) was irradiated with gamma -rays from a cobalt-60 source. The molar ratio of H sub 2 to CO sub 2 was 4.0, the pressure of the mixture 9.0 kg/cm exp 2 gauge at 30 exp 0 C, the temperature 50 exp 0 - 450 exp 0 C, the dose rate 8.34 x 10 exp 5 rad/hr, and the total dose 20 Mrad. Carbon monoxide (CO), methane (CH sub 4), and ethane (C sub 2 H sub 6) were observable as the main products. The G-values for formations of CO, CH sub 4 , and C sub 2 H sub 6 were 0.24, 0.25, and 0.03 at 100 exp 0 C, and increased to 27.7, 2.1, and 1.9 at 450 exp 0 C, respectively. The G-values were calculated from the yields after subtracting the yields due to the pure thermal reactions from the ones of the reactions under gamma -irradiation. The activation energies of the G-values were 4.8, 0.0, and 0.0 kcal/mol below 200 exp 0 C, and 11.3, 6.7, and 15.7 kcal/mol above 250 exp 0 C for formations of CO, CH sub 4 , and C sub 2 H sub 6 , respectively. The boundary temperatures at which the activation energies changed were estimated to be 240, 221, and 239 exp 0 C for the respective products. On the basis of these results, the temperature dependence of the radiation effect in the reaction of H sub 2 with CO sub 2 is discussed. (Atomindex citation 11:496368)

JEN-450 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Determination of Low Concentrations of Piperidine Pyridine by Gas Chromatography and Infrared Spectroscopy.
M. Perez Garcia, and R. Parellada Bellod. 1979, 12p
In Spanish.
U.S. Sales Only.

The determination of low amounts of pyridine piperidine in the concentration range of 0-5% is described. After an exhausting review of the bibliography on the column selection, the chromatographic separation and determination are made on the following column: 27% Pennwait-223; 4% KOH on Gas-Chrom R; 80-100 mesh with flame ionization detector. The retention indexes of both compounds and the Rohrschneider constants of the phase used are calculated. The minimum detection limit achieved for piperidine is 0,25%. For the determination by infrared spectroscopy, the band at 1320 cmsup(-1) of piperidine has been chosen. The absorbances have been calculated and the corresponding calibration curve obtained. (Atomindex citation 11:496232)

JEN-452 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Spectrographic Determination of Impurities in Ammonium Hydrogen Fluoride Samples. II. Study of the Behaviour the Added Matrices.
F. A. Alduan, C Capdevila, and M. Roca. 1979, 21p
In Spanish.
U.S. Sales Only.

In order to account for the variations in the shape of the excitation-volatilization curves and the values of the line intensities of the different impurities determined in ammonium bifluoride, the behaviour of the added matrices (graphite, Ga sub 2 O sub 3 , GeO sub 2 , MgO and ZnO) has been considered. With this aim the influence of the added matrices on the arc discharge parameters (temperature and electronic concentration) and on the exhaustion rate of the electrode load as a function of the excitation time has been studied. On the other hand, the curve of variation of the line intensity of the metallic component of each matrix versus time has been obtained and the residues in the electrode cavity have been investigated by X-ray powder diffraction. (Atomindex citation 11:496197)

JEN-453 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Spectrographic Determination of Impurities in Ammonium Bifluoride. III. Study of Processes of Vaporiation Transport and Excitation of the Elements Al, B, Cu and Cr.
F. A. Alduan, C. Capdevila, and M. Roca. 1979, 20p
In Spanish.
U.S. Sales Only.

The influences of the processes of vaporization, transport and excitation on the shape of the volatilization-excitation curves and on the values of the spectral-line intensities have been investigated in a method for the spectrographic determination of Al, B, Cu and Cr in ammonium bifluoride samples by direct current arc excitation in Scribner type electrodes, with addition of different matrices (graphite, Ga sub 2 0 sub 2 , Ge0 sub 2 , Mgo and Zn0). The reaction products in the electrode cavity have been identified by X-ray powder diffraction analysis and the percentages of vaporized and diffused element evaluated through analysis by totalburning spectrographic methods. In addition, the values of both the number of particles entering the discharge column and the transport efficiencies have been calculated. Thus, the origin of most observed differences has been explained. (Atomindex citation 11:496198)

JINR-R-2-10738 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Positronium Production with Electron Accelerators.
A. A. Akhundov, D. Yu. Bardin, and L. L. Nemenov. 1977, 12p
In Russian.
U.S. Sales Only.

Positronium production in the electron interactions with matter is considered. The energy and angular characteristics of para- and orthopositronium produced are calculated. Positronium yield into the para- and ortho-states, which may be achieved at existing electron accelerators (ring and linear ones), is estimated. It is shown that the electron accelerators are the sources of rather intensive and well-formed positronium beams. (Atomindex citation 10:427761)

JINR-R-3-11742 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Isomer Shift of Neutron Resonances. Pt. 3. Determination of Electron Density Differences at the Nucleus Between Uranium Metal and Various Uranium Compounds.
K. Seidel, A. Meister, and D. Pabst. 1978, 18p
In Russian.
U.S. Sales Only.

Electron density differences at the nucleus between uranium metal, trivalent, tetravalent, and hexavalent uranium compounds have been determined. The calculations are based upon experimental values known for the chemical shift of the Lsub(alpha 1) x-ray line of uranium and for chemically induced changes in the radioactivity constant of exp 235 U. (Atomindex citation 10:438801)

JINR-R-4-11577 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Schwinger Variational Principle in Scattering Problems of Charged Particles on Mesic Atoms and Atoms.
V. B. Belyaev, E. Vzhetsionko, A. L. Zubarev, and A. P. Podkopaev. 1978, 14p
In Russian.
U.S. Sales Only.

The Schwinger variational principle is applied to solve the problems of atomic physics. A separable approximation for a Hamiltonian of a bound subsystem is used. The length of e exp + H-scattering and the elastic p(d mu)-scattering cross section are calculated in the second Born approximation. (Atomindex citation 10:427770)

JINR-R-9-11518 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Optical Method of Particle Acceleration in the Rectified Light Field in Nonlinear Crystals.
A. F. Pisarev. 1978, 15p
In Russian.
U.S. Sales Only.

The theoretical analysis of a new approach to the acceleration of charged particles channeling in nonlinear crystals due to the effect of static electric polarization appearing in the course of pumping the monochromatic light wave is considered. Examples of linear and cyclic acceleration of particles are considered. It is shown that the static field strength of "rectified" light reaches the quantity of 4x10 exp 7 V/cm. It means that at the optical crystal length of 100 cm the energy of accelerated particles is equal to 4 GeV. For 100 GeV nucleons the radius of the ring equal to 3-4 cm. The problems of inputting and outputting of the channeling particles in plane and cyclic crystals are considered. It is shown that the conditions of phase synchronism of particle acceleration and phase stability of their motion in crystals are easily fulfilled both in linear and cyclic accelerators. The calculations showed that the phenomenon of nonlinear rectification of light in crystals and the effect of particle channeling opens a large perspective for the development of the new class of miniscaled accelerators with superrelativistic energies. (Atomindex citation 10:437856)

KFK-tr-572 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Internationales Buero/Uebersetzergruppe.
Selectivity of the Extraction of Trivalent Transplutonium Elements with Neutral Phosphorous Organic Compounds from Halide Solutions.
E. G. Chudinov, and E. P. Derevyanko. May 78, 22p
In German.
U.S. Sales Only.

The selectivity of the extraction of americium, curium, californium and einsteinium with a series of neutral, phosphorous organic compounds from chloride and bromide solutions was investigated. The experimental and theoretical separation factors in these systems were compared. The calculation indicates that the increased extraction ability of californium and einsteinium as compared to americium and curium can be achieved by increasing the number of halide ions which are bonded in the inner coordination sphere of the actinide atom in the complex to be extracted with simultaneous reduction of the fractions of metal bonded in the complexes is the aqueous phase. The difference in selectivity of extraction of the chlorides and bromides of the f elements can be explained by the decrease in complex formation in the inner coordination sphere during transfer from chloride complexes to bromide complexes. (orig.) 891 RB. (Atomindex citation 10:429520)

KFK-tr-573 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Internationales Buero/Uebersetzergruppe.
Dibutyl Phosphates of the Quadrivalent Plutonium, Zirconium and Thorium Formed in Tri-N-Butyl Phosphate (TBP) Solutions.
L. P. Sokhina, A. S. Solovkin, E. G. Teterin, F. A. Bogdanov, and N. N. Shesterikov. May 78, 16p
In German.
U.S. Sales Only.

The conditions for the formation of di-n-butyl phosphates of zirconium, thorium and quadrivalent plutonium which separate out from solutions of di-n-butyl phosphoric acid (DBP, HA) in a mixture of 10 vol% tri-n-butyl phosphate (TBP) with organic diluting agent (benzene, carbon tetrachloride, cerosine) are investigated and their relationships determined. It was shown that precipitates of the composition Zr(NO sub 3) sub 2 A sub 2 separate out is the solutions independent of the HA: zirconium ratio (within the limits 0.66-4.2); plutonium and thorium form precipitates only from solutions in cerosine with the composition Pu(NO sub 3) sub 2 A sub 2 and ThA sub 4 . Chemical analyses and cryoscopic investigations of the precipitates were performed and the possible structures of the DBP compounds with metals obtained were observed. (orig) 891 RB. (Atomindex citation 10:429547)

KFKI-1978-19 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Nuclear Magnetic Resonance and Relaxation on PAA.
I. Pocsik, and K. Tompa. Mar 78, 13p CONF-7709182-1
Liquid crystal conference of the Socialist Countries, Sunny Beach, Bulgaria, 27 Sep 1977.
U.S. Sales Only.

The cw and FT-NMR spectra and relaxation times of dimethoxy-azoxy-benzene in the nematic and crystalline phases were measured over a wide temperature range. Conclusions concerning the hopping and tunnelling of methyl groups becoming active can be drawn from the change in the second moment vs. temperature curve as well as from spin lattice relaxation time measurements. On the basis of the FT-NMR results, a new angular distribution function of the long molecular axis can be given, in which the Meier-Saupe potential is complemented by a new term. (Atomindex citation 10:428019)

LAFI-001 PC **A02**/MF **A01**
AN Latvijskoj SSR, Riga. Inst. Fiziki.
Asymptotic Approach to the Stark Effect for Atomic Hydrogen.
R. J. Damburg, and V. V. Kolosov. 1977, 20p
In Russian.
U.S. Sales Only.

A method which permits one to obtain an asymptotic expansion for the level width GITA of an arbitrary quasistationary state of a hydrogen atom in a uniform electric field is considered. To find GITA the equation, which describes pene--tration through a potential barrier, is solved in two regions. In the region, including the origin of coordinate axes, the solution looks like a combination of the Laguerre polynomials with further transition to degenerate hypergeometric functions. In the region, including the external turning point, the solution is made using the Airy functions by the comparison equation method. Matching asymptotes of these solutions makes it possible to define GITA in the form of asymptotic expansion. Two first terms of the expansion have been obtained for the states described by arbitrary parabolic quantum numbers n sub 1 ,n sub 2 ,m, and three terms - for the case, when n sub 2 =m=0. The applicability region of the obtained asymptotic formulae has been estimated. If compared to the data of exact numerical calculation, the results of the formulae application show that for small n sub 2 the formulae manifest a good fit even for considerably ionizing electric fields. However, when n sub 2 is growing the region of applicability of the asymptotic formulae is moving to weak electric fields with small ionization rates. (Atomindex citation 10:427789)

ND-R-240(R) PC **A02**/MF **A01**
UKAEA, Risley. Nuclear Power Development Labs.
Determination of Chloride in Water. A Comparison of Three Methods.
P. J. Steele. Sep 78, 22p
U.S. Sales Only.

The presence of chloride in the water circuits of nuclear reactors, power stations and experimental rigs is undesirable because of the possibility of corrosion. Three methods are considered for the determination of chloride in water in the 0 to 10 mu g ml exp -1 range. The potentiometric method, using a silver-silver chloride electrode, is capable of determining chloride above the 0.1 mu g ml exp -1 level, with a standard deviation of 0.03 to 0.12 mu g ml exp -1 in the range 0.1 to 6.0 mu g ml exp -1 chloride. Bromide, iodide and strong reducing agents interfere but none of the cations likely to be present has an effect. The method is very susceptible to variations in temperature. The turbidimetric method involves the production of suspended silver chloride by the addition of silver nitride solution to the sample. The method is somewhat unreliable and is more useful as a rapid, routine limit-testing technique. In the third method, chloride in the sample is pre-concentrated by co-precipitation on lead phosphate, redissolved in acidified ferric nitrate solution and determined colorimetrically by the addition of mercuric thiocyanate solution. It is suitable for determining chloride in the range 0 to 50 mu g, using a sample volume of 100 to 500 ml. None of the chemical species likely to be present interferes. In all three methods, chloride contamination can occur at any point in the determination. Analyses should be carried out in conditions where airborne contamination is minimised and a high degree of cleanliness must be maintained. (Atomindex citation 10:429294)

NRCN-437 PC **A02**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Isotope Shifts in Electronic Energy Levels of exp 238 U and exp 235 U.
E. Miron, R. David, G. Erez, SH. Lavi, and L. A. Levin. Jan 78, 10p
In Hebrew.
U.S. Sales Only.

A simple method for measurement of isotope shifts of atomic uranium is described. Three dye lasers are tuned to the transition wavelengths by monitoring the fluorescence from the uranium atoms. Interference rings are formed by passing a dye laser beam through a Fabry-Perot interferometer and are displayed on a CCTV monitor. The radii of the rings are used to compute the isotope shifts. The values of 17 isotope shifts ewrw measured; 12 of the values are presented for the first time. (Atomindex citation 10:431330)

NRL-MR-4177 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
XUV Spectra of Mo XIII-XVIII.
P. G. Burkhalter, J. Reader, and R. D. Cowan. 11 Mar 80, 28p
Contract EX-76-A-34-1006

Spectral lines from intermediate stages of ionization in Mo were measured and identified. The Mo spectra were observed from a laser-produced plasma and vacuum-spark data. The wavelengths

of the 3d exp 10 -3d exp 9 4p, 4f transitions in Mo XV and the 3p exp 6 3d exp 9 -3p exp 5 3d exp 10 lines in Mo XVI were measured with an estimated accuracy of +- 0.010A. Line classifications were obtained in complex spectral arrays in Mo XIV-XVIII. These were made with the aid of relativistically-corrected Hartree-Fock calculations. Energy-level diagrams were constructed for the 3d exp 8 4p and 3d exp 8 4f configuration in Mo XVI. (ERA citation 05:025002)

NUREG/CR-1301 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Analysis of Organohalogen Products from Chlorination of Natural Waters Under Simulated Biofouling Control Conditions,
R. M. Bean, D. C. Mann, and R. G. Riley. Jun 80, 103p PNL-3275

The products of low-level chlorination of natural waters from ten locations across the continental United States have been studied, with emphasis on volatile and lipophilic organohalogen components. A specially designed apparatus permitted continuous sampling and chlorination of water in a manner analogous to some types of cooling water treatments. Volatile components were analyzed using headspace, purge-and-trap, and resin adsorption methods. The less-volatile components were collected by passing large volumes of the chlorinated water over XAD-2 columns. Total organic halogen collected on XAD resins was compared with the halogen contribution of haloform compounds. The XAD samples were further separated into fractions according to molecular weight and polarity using liquid chromatography. These studies indicate that haloforms are the most abundant lipophilic halogenated products formed from low-level chlorination of natural waters, but that other halogenated lipophilic material is also formed.

N80-27452/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Structure of Complexes Between Aluminum Chloride and Other Chlorides, 2: Alkali-(Chlorooaluminates). Gaseous Complexes.
M. Hargittai. Apr 80, 36p NASA-TM-75762
Contract NASW-3199
Transl. into English from Kem. Kozlem., V. 50, No. 4, 1978 p 489-514. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The structural chemistry of complexes between aluminum chloride and other metal chlorides is important both for practice and theory. Condensed-phase as well as vapor-phase complexes are of interest. Structural information on such complexes is reviewed. The first emphasis is given to the molten state because of its practical importance. Aluminum chloride forms volatile complexes with other metal chlorides and these vapor-phase complexes are dealt with in the second part. Finally, the variations in molecular shape and geometrical parameters are summarized.

N80-28167/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Tables of Transition Probabilities and Branching Ratios for Electric Dipole Transmissions Between Arbitrary Levels of Hydrogen-Like Atoms.
K. Omidvar. Jun 80, 35p NASA-TM-80682

Branching ratios in hydrogen-like atoms due to electric-dipole transitions are tabulated for the initial principal and angular momentum quantum number n, lambda, and final principal and angular momentum quantum numbers n, lambda. In table 1, transition probabilities are given for transitions n, lambda, yields n, where sums have been made with respect to lambda. In this table, 2 or = n' or = 10, o or = lambda' or = n'-1, and 1 or = n or = n'-1. In addition, averages with respect to lambda' and sums with respect to n, and lifetimes are given. In table 2, branching ratios are given for transitions n' lambda' yields ni, where sums have been made with respect to lambda. In these tables, 2 or = n' or = 10, 0 or = lambda', n'-1, and 1 or = n or = n'-1. Averages with respect to lambda' are also given. In table 3, branching ratios are given for transitions n' lambda' yields in lambda, where 1 or = n or = 5, 0 or = lambda or = n-1, n n' or = 15, and 0 or = lambda' or = n(s), where n(s), is the smaller of the two numbers n'-1 and 6. Averages with respect to lambda' are given.

PAT-APPL-6-041 364 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Chromatographic Hydrogen Isotope Separation.
Patent Application,
F. T. Aldridge. Filed 22 May 79, 10p
Contract W-7405-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Intermetallic compounds with the CaCu sub 5 type of crystal structure, particularly LaNiCo sub 4 and CaNi sub 5 , exhibit high separation factors and fast equilibrium times and therefore are useful for packing a chromatographic hydrogen isotope separation column. The addition of an inert metal to dilute the hydride improves performance of the column. A large scale multi-stage chromatographic separation process run as a secondary process off a hydrogen feedstream from an industrial plant which uses large volumes of hydrogen cn produce large quantities of heavy water at an effective cost for use in heavy water reactors. (ERA citation 05:028555)

PAT-APPL-6-062 372 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Method for Detecting Trace Impurities in Gases.
Patent Application,
S. M. Freund, W. B. Maier, II, R. F. Holland, and W. H. Beattie. Filed 31 Jul 79, 11p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A technique for considerably improving the sensitivity and specificity of infrared spectrometry as applied to quantitative determination of trace impurities in various carrier or solvent gases is presented. A gas to be examined for impurities is liquefied and infrared absorption spectra of the liquid are obtained. Spectral simplification and number densities of impurities in the optical path are substantially higher than are obtainable in similar gas-phase analyses. Carbon dioxide impurity (approx. 2 ppM) present in commercial Xe and ppM levels of Freon 12 and vinyl chloride added to liquefied air are used to illustrate the method. (ERA citation 05:029376)

PAT-APPL-6-069 151 PC **A02**/MF **A01**
Department of Energy, Washinton, DC.
Photolytic Separation of Isotopes in Cryogenic Solution.
Patent Application,
S. M. Freund, W. B. Maier, II, R. F. Holland, and W. H. Battie. Filed 23 Aug 79, 13p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Separation of carbon isotopes by photolysis of CS sub 2 in cryogenic solutions of nitrogen, krypton and argon with 206 nm light from an iodine resonance lamp is reported. The spectral distributionn of the ultraviolet absorption depends on solvent. Thus, in liquid nitrogen the photolytic decomposition rate of exp 13 CS sub 2 is greater than that of exp 12 CS sub 2 (because the absorption of 206 nm radiation is greater for exp 13 CS sub 2), whereas in liquid krypton and liquid argon the reverse is true. The shift in ultraviolet spectrum is a general phenomenon readily characterized as a function of solvent polarizability, and exhibits behavior similar to that for vibrational transitions occurring in the infrared. (ERA citation 05:029394)

PAT-APPL-6-150 550 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Encapsulation by Entrapment.
Patent Application,
Baruch S. Shasha, William M. Doane, and Charles R. Russell. Filed 16 May 80, 20p PB80-204852
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Chemical biological agents to be encapsulated are dissolved or dispersed in an aqueous solution of polyhydroxy polymer xanthate. Simultaneous addition of a strong acid and a coupling agent to the solution insolubilizes the polyhydroxy polymer without degrading the xanthate moiety, thereby entrapping the agents in a protective matrix. Encapsulation of biologically active compositions provides a shield against hostile environments, improves safety in handling, and slows the release of such compounds to the surrounding medium. Highly volatile liquids are protected against losses by evaporation. Encapsulation also provides protection against decomposition from exposure to ultraviolet light.

PATENT-4 207 068
Not available NTIS
Department of Agriculture, Washington, DC.
Process for Producing Chambray and Other Dyed Fabrics Through Phosphorylation.
Patent,
Eugene J. Blanchard, Joseph S. Bruno, and Gloria A. Gautreaux. Filed 16 Oct 78, patented 10 Jun 80, 5p PB80-198153, PAT-APPL-951 539 Supersedes PB-290 549.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The application of Raman spectroscopy to the molecular characterization of individual particles from stationary sources is described. The NBS-developed Raman microprobe has been used to characterize microparticles of oil- and coal-fired power plant emissions and boiler samples collected and described by the Environmental Protection Agency. The samples were examined on an 'as received' basis and the results reported do not take into account any sample modifications that may have occurred during sample collection. Raman microprobe analyses of a number of dense agglomerations of largely submicrometer particles, from a sample collected by the EPA and described as coal fly ash, show no Raman spectral features to indicate a glassy material when the particles are first exposed to laser excitation.

PB80-199847 Not available NTIS
National Bureau of Standards, Washington, DC.
Atomic Many-Body Perturbation Theory Using Radially Restricted Basis Functions.
Final rept.,
S. M. Younger. 1980, 12p
Pub. in Physical Review A 21, n5 p1364-1375 May 80.

The construction of a potential barrier around an atom such that a chosen zeroth-order state is left unaffected results in a square-integrable virtual basis set with rapid convergence properties for use in atomic many-body perturbation theory. Encouraging results have been obtained using this technique for calculations of the correlation energies and transition probabilities of small atoms and ions. In the case of H- it is shown that the conventional formulation of many-body perturbation theory involving continuum functions produces classes of energy diagrams which diverge with order, although the total summation remains finite. No such divergence is present in a properly constructed contracted basis set.

PB80-199854 Not available NTIS
National Bureau of Standards, Washington, DC.
Observation of the OH+ Fragment Threshold Photoelectron Spectra of Water.
Final rept.,
R. Stockbauer. 1980, 3p
Pub. in Jnl. of Chemical Physics 72, n9 p5277-2579, 1 May 80.

A step in the threshold photoelectron spectra of H2O and D2O is observed at the onset for the OH(+) and OD(+) fragmentations. The coincident ion mass spectrum shows that the step is associated with the fragmentation process. This is explained in terms of a change in the competition between formation of charged and neutral products brought about by the opening of the fragmentation channel.

PB80-200140 PC **A05**/MF **A01**
New Hampshire Univ., Durham. Water Resources Research Center.

Formation and Control of Trihalomethanes in Chlorinated Drinking Waters Containing Fulvic Acid.
Technical completion rept.,
Dennis J. O'Brien, Richard L. Bixby, Marc A. Jewett, and Kenneth M. Stewart. May 80, 93p RR-27, W80-05802, OWRT-A-048-NH(3)
Contract DI-14-34-0001-8031
Prepared in cooperation with New Hampshire Univ., Durham. Dept. of Civil Engineering.

The formation of halogenated organic compounds in drinking waters is a potentially serious environmental problem. This study examined the production of trihalomethanes by the chlorination of drinking waters containing fulvic acid and the effects of conventional water treatment processes on this phenomenon. Initially, fulvic acid was further fractionated into four subfractions by column chromatographic techniques. Chemical analysis via C-H-N-O elemental analysis, infrared spectroscopy, and nuclear magnetic resonance spectroscopy was employed to gain information on functional group content and distribution. The chlorination of fulvic acid fractions confirmed that fulvic acid compounds are significant precursors to trihalomethane formation and indicated that a number of chemical structures and functional groups is involved in the haloform reaction. The removal of fulvic acid in coagulation processes and its relationship to trihalomethane formation upon subsequent chlorination were studied in controlled experiments. Results indicated that coagulation does not uniformly remove all fulvic acid compounds. Evidence suggests that low molecular weight aromatic compounds are poorly removed by coagulation processes. In addition, studies demonstrated that the chloroform yield of fulvic acid compounds decreased significantly following coagulation.

PB80-200371 Not available NTIS
National Bureau of Standards, Washington, DC.
Theoretical Simulation of the Decay of the 4s4p 1P(0)1 Level in Kr VII Following Beam-Foil Excitation.
Final rept.,
S. M. Younger, W. L. Wiese, and E. J. Knystautas. May 80, 5p
Sponsored in part by Department of Energy, Washinton, DC.
Pub. in Jnl. Phys. Rev. A 21, n5 p1556-1560 May 80.

The decay of the 4s4p singlet P sub (1) sup (0) level in Kr VII following beam-foil excitation has been simulated using theoretical initial-state populations and calculated transition probabilities. It was found that the decay curve was substantially influenced by cascading from higher levels and that such cascades dominate the decay in the region beyond three times the lifetime of the 4s4p singlet P sub (1) sups (0) level. The simulation is in good agreement with an experimental decay curve at short decay times, but is unable to reproduce the long-time behavior of the experimental data. However, recent spectroscopic evidence indicates that line blending is responsible for this aspect. Complications due to core-excited states and other complex cascade mechanisms are discussed.

PB80-200405 Not available NTIS
National Bureau of Standards, Washington, DC.
Photofragmentation Dynamics and Reactive Collisions of Laser-Excited Electronic States.
Final rept.,
S. L. Baughcum, H. Hofmann, S. R. Leone, and D. J. Nesbitt. 1979, 10p
Contract N00014-77-C-0115, Grant NSF-PHY76-04761
Sponsored in part by Grant NSF-CHE76-22600.
Pub. in Jnl. Faraday Discuss. Chem. Soc. 67, n1 p306-315 1979 (Proc. Faraday Symp. 67, Held at Birmingham (England) on Apr 4-11, 1979.

Tunable laser excitation followed by observation of infrared fluorescence provides a means of readily studying electronically excited photoproducts and their reactions. A number of specific examples involving the production of I* 5 doublet P(1/2) and Br* (4 doublet p(1/2)) upon molecular photodissociation are considered. The quantum yield of I* production from HgI2 is obtained as a function of wavelength. An inconclusive search was made for unobserved states in IBr which lead to I* product atoms and for states of BrCl which lead to Br*. Vibrationally excited HBr product molecules are observed in 10% of the quenching collisions of Br* with H2S.

PB80-200413 PC **A08**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
EPA/IERL-RTP Procedures Manual: Level 2 Sampling and Analysis of Oxidized Inorganic Compounds.
Final rept. Jul 76-Aug 79,
R. F. Maddalone, L. E. Ryan, R. G. Delumyea, and J. A. Wilson. Nov 79, 172p EPA-600/2-79-200
Contract EPA-68-02-2165

The report describes Level 2 analysis procedures for identifying oxidized inorganic compounds in environmental samples from energy and industrial processes. The procedures include: (1) initial sample characterization, (2) bulk sample characterization, and (3) individual particle characterization. The theory, sensitivity interferences, sample preparation, application, and information derived are described for each procedure. The report is a step in the development of a general methodology for analysis of process samples. It defines the concepts of Level 2 analyses and reviews currently available procedures. It does not define a fixed protocol because the complexity of samples precludes definition of specific procedures without examination or analysis.

PB80-200462 PC **A03**/MF **A01**
EIC Corp., Newton, MA.
Low Temperature Thermoconversion of Biomass to Useful Chemicals by Lewis Acid Catalysts. Phase I.
Final rept. 1 Oct 79-31 Mar 80,
V. R. Koch, and G. H. Schnaper. Mar 80, 28p NSF/RA-800067
Grant NSF-PFR79-17513

The goal of this study was to convert biomass into useful organic chemicals at reasonable cost. Lewis acids such as aluminum chloride (AlCl3) were used for thermoconversion of lignocellulosic materials (biomass) into useful organic materials. Temperatures used in the process were lower than those heretofore reported. A renewable domestic resource such as biomass provides an alternative source of industrially important organic materials. Use of a temperature range between those of liquefaction and biological fermentation insures product selectivity at reasonable reaction rates. Rice hulls and AlCl3 were heated in an argon filled reactor from ambient to 175C. Reaction products collected from 120C to 175C consisted of CO, CO2, acetone, methylisobutyl ketone, and three unidentified carbohydrates. Intimate contact between the solid AlCl3 acts as a reactant rather than as a catalyst. The hemicellulose portion of the rice hulls proved to be the source of these compounds. Lignin and cellulose failed to produce volatile products at 175C. In addition, AlCl3 was consumed during the hydrolysis procedure.

PB80-200793 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Analytical Procedures for Determining Organic Priority Pollutants in Municipal Sludges.
Final rept.,
J. S. Warner, G. A. Jungclaus, T. M. Engel, R. M. Riggin, and C. C. Chuang. Mar 80, 58p EPA-600/2-80-030
Contract EPA-68-03-2624

An analytical procedure was developed for the determination of 54 semi-volatile organic priority pollutants in sludge at levels down to 0.01 microgram/g wet weight. The procedure involved extraction with methylene chloride or chloroform, cleanup of groups of compounds having common properties, and in most cases analysis of the fractions by GC-MS using high-resolution glass capillary columns and selected ion searches. The final analyses involved the analysis of three separate fractions, namely benzidines, phenols, and neutrals. The benzidines were determined by HPLC analysis using an electrochemical detector instead of by GC-MS because GC-MS sensitivity for these compounds was too low. Quantitation in the GC-MS analyses involved the internal standard method applied to selected ion responses. Relative response factors obtained from the analysis of standard solutions were used as correction factors.

PB80-201189 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Chesapeake Bay Inst.
Results of a Preliminary Study of the Fluorescent Background Problem.
Special rept.,
Donald W. Pritchard. Jun 79, 43p CBI/SR-72, REF-79-3
Sponsored in part by Maryland Dept. of Natural Resources, Annapolis. Power Plant Siting Program.

The fluorescent background problem arises from a loss in effectiveness of the fluorescent dye tracer technique due to an increase of variability in time and space of the interfering background readings of fluorometers used to measure fluorescent dye concentration. This study is a preliminary study and is intended to provide sufficient information to adequately define the problem, to indicate possible solutions to the problem, and to outline a detailed research program to fully resolve the problem.

PB80-201551 PC **A23**/MF **A01**
Washington Univ., Seattle.
Proceedings of the Workshop on Interfacial Phenomena: Research Needs and Priorities, Held at Seattle, Washington on February 15-16, 1979.
John C. Berg. Feb 79, 541p NSF/RA-790442
Grant NSF-ENG78-22096

This workshop provided a forum for researchers engaged in the study of interfacial phenomena to summarize current knowledge and to highlight developments pertinent to establishing future research funding priorities in the field. The recent resurgence of interest in interfacial phenomena stems from increased awareness of their intimate connection with energy supply, pollution abatement, biomedical grade materials, and many industrial and natural processes. Participants examined four important fundamentals: (1) interfacial transport phenomena dealing with the formulation of equations of change and constitutive equations for multicomponent deforming interfaces, and the measurement of surface rheological and transport properties which they define; (2) equilibrium structure and thermodynamics of fluid interface systems involving the prediction of boundary tensions, adsorption, and configurations of interface systems in terms of molecular properties, and techniques for their measurement; (3) heat and mass transfer across moving interfaces studying the effect of interfacial thermodynamic and transport behavior on processes of heat and mass transfer across fluid interfaces; and (4) physiochemical aspects of biological phenomena at the solid aqueous interface investigating surface chemistry as a fundamental determinant of biological interaction.

PB80-202120 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Guidance for the Collection and Use of Ambient Hydrocarbon Species Data in Development of Ozone Control Strategies.
Final rept. May-Dec 79,
Hanwant B. Singh. Apr 80, 64p EPA-450/4-80-006
Contract EPA-68-02-2548

This document provides a standard set of procedures that can be routinely and reliably depended upon to obtain NMHC species composition of the ambient air. The document discusses the needs that exist for the quantification of ambient HC species, especially as they relate to air quality management applications. Procedures for site selection, sample collection and storage, calibrations and analysis, and quality assurance and control are described. State-of-the-art HC species analysis techniques are unable to identify 10 to 35 percent of the ambient NMHC burden. Recommendations are made to fill gaps in our current knowledge.

PB80-202708 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.

Raman Microprobe Analysis of Stationary Source Particulate Pollutants.
Final rept. Aug 77-Jul 79,
John J. Blaha, Edgar S. Etz, and Kurt F. J. Heinrich. 1979, 33p EPA-600/2-80-173

The application of Raman spectroscopy to the molecular characterization of individual particles from stationary sources is described. The NBS-developed Raman microprobe has been used to characterize microparticles of oil- and coal-fired power plant emissions and boiler samples collected and described by the Environmental Protection Agency. The samples were examined on an 'as received' basis and the results reported do not take into account any sample modifications that may have occurred during sample collection. Raman microprobe analyses of a number of dense agglomerations of largely submicrometer particles, from a sample collected by the EPA and described as coal fly ash, show no Raman spectral features to indicate a glassy material when the particles are first exposed to laser excitation.

PB80-202716 PC **A10**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Evaluation of the Basic GC/MS (Gas Chromatographic/Mass Spectrometric) Computer Analysis Technique for Pollutant Analysis.
Final rept.,
J. E. Bunch, N. P. Castillo, D. Smith, J. T. Bursey, and E. D. Pellizzari. 1979, 207p EPA-600/2-80-171
Contract EPA-68-02-2998

The basic gas chromatographic/mass spectrometric/computer technique for the analysis of vapor-phase organic compounds collected on a solid sorbent was evaluated. Emphasis was placed on the assessment of performance and improvement in techniques in the following areas: (1) wide-bore wall coated columns for organic vapor-phase analysis; (2) gas chromatography/negative chemical ionization mass spectrometry/computer analysis of halogenated/hydrocarbons in ambient air; (3) the concentration of vapor-phase organics from the atmosphere on solid sorbents (in situ reactions); and (4) qualitative and quantitative analysis of vapor-phase organics utilizing the improved technology.

PB80-203037 Not available NTIS
National Bureau of Standards, Washington, DC.
Measurement of the Relative Enthalpy of Tungsten Between 273.15 and 1173.15 K; Derived Electronic Heat-Capacity Coefficient.
Final rept.,
D. A. Ditmars. 1979, 10p
Pub. in High Temperatures - High Pressures. International Jnl. of Research 11, p615-624 1979.

The enthalpy relative to the enthalpy at 273 K of two tungsten samples, one single-crystal (>99.99% pure) and one polycrystalline sintered (>99.9% pure), has been measured between 273 and 1173 K in a precision Bunsen ice calorimeter. The enthalpy values are believed to have an overall inaccuracy = or < 0.3%. The enthalpy of the single-crystal sample is uniformly 0.3% above that of the sintered samples. The heat capacity is found to be in good agreement with literature for tungsten. The value of 1.9 mJ/mol/sq K for the electronic heat-capacity coefficient of tungsten derived from the measured data is about twice as large as currently accepted values for this coefficient derived from heat-capacity data below 20 K.

PB80-203045 Not available NTIS
National Bureau of Standards, Washington, DC.
Millimeter Wave Spectrum of Glycine.
Final rept.,
R. D. Suenram, and F. J. Lovas. 1978, 11p
Pub. in Jnl. of Molecular Structure 72, p372-382 1978.

The millimeter wave spectrum of glycine (NH_2CH_2COOH), the simplest amino acid, is reported. The observed alpha-type transitions have been fit to a centrifugal distortion model for both the ground and first excited vibrational state. Based on qualitative arguments, a lower limit of about 3 Debye has been determined for the mu(a) component of the molecular electric dipole moment. The spectral data are consistent with the compact conformation as the source of the observed spectrum. This conformer involves a hydrogen bond between the lone pair of electrons of the amino group and the hydrogen atom of the hydroxyl group.

PB80-203060 Not available NTIS
National Bureau of Standards, Washington, DC.
Surface Plasmon Relaxation Energies for CO Absorbed on Jellium.
Final rept.,
B. J. Dunlap, and J. W. Gadzuk. 1980, 16p
Pub. in Surface Science 94, p89-104 1980.

Substrate induced screening or extra-atomic relaxation energies are calculated for molecular orbital (MO) hole states of CO adsorbed on jellium surfaces, within a previously elucidated linear response model.

PB80-203128 PC **A19**/MF **A01**
National Training and Operational Technology Center, Cincinnati, OH.
Methods for the Determination of Chemical Contaminants in Drinking Water - Participants Handbook.
Training manual.
Mar 80, 439p EPA-430/1-80-006
Supersedes PB-284 392.

This laboratory manual is designed to contain analytical procedures for all parameters listed in the National Interim Primary Drinking Water Regulations (NIPDWR). Some procedures may be carried out by operators or laboratory technicians with little or no experience (chlorine, turbidity, fluoride, nitrate) while other parameters require understanding and experience in using sophisticated analytical equipment (atomic absorption, gas chromatography). Parameters included are procedures for silver, cadmium, chromium, lead, mercury, arsenic, selenium, nitrate, fluoride, barium, chlorine, turbidity, pesticides, herbicides. It is written in a step-by-step format.

PB80-203276 PC **A03**/MF **A01**
Delaware Univ., Newark. Coll. of Marine Studies.
Chiroptical Properties of Chitin, Chitosan, and Glycosides of N-Acetylglucosamine,
Paul R. Austin, Charles J. Brine, Shyam N. Hirwe, George A. Reed, and Helen A. Whelan. Mar 80, 32p DEL-SG-01-80, NOAA-80060902
Grant NOAA-04-6-158-44025
Prepared in cooperation with FMC Corp. and Pennsylvania Univ., Philadelphia. School of Veterinary Medicine.

This report is a compilation of the following articles and patents: Helical Shells and Chiralty; Optically Active Chitosan Solution; Chitin Preparation with Sulfurous Acid; Glucosamine Products for Diet Supplementation; Preparation of Alkyl Glycosides of Amino Sugars--U.S. Patent 4,152,513; Method for converting Dextro to Levo Rotatory Chitin--U.S. Patent 4,165,433; and Chitin Publications from the University of Delaware.

PB80-203441 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
National Bureau of Standards Mass Calibration Computer Software.
Final rept.,
R. N. Varner, and R. C. Raybold. Jul 80, 170p
NBS-TN-1127

This report describes the Fortran computer program used to generate a comprehensive report covering the sequence of operations used to assign mass values to weights submitted to the National Bureau of Standards for calibration. The assignment of these values is accomplished by the method of least squares analysts of the observation of differences between test items and reference items having the same or nearly same density and normal size. The calculations are defined and the various weighing method options are given. To assist in the implementation of the computer program, a flow chart, a description of each subprogram, a cross-reference of labeled COMMON, a list of DOUBLE PRECISION variables, a list of EQUIVALENCED variables and other pertinent information is given.

PB80-203623 PC **A06**/MF **A01**
American Petroleum Inst., Washington, DC.
Evaluation of Ammonia 'Fixation' Components in Actual Refinery Sour Waters.
Final rept. Mar 76-Nov 77.
May 80, 124p API-PUB-954, EPA-600/2-80-081
Grant EPA-R-804364010
Prepared in cooperation with SRI International, Menlo Park, CA.

High ammonia concentrations (fixed ammonia) in stripped sour waters from petroleum refining are caused by weak organic acids and both weak and strong sulfur acids. The sulfur acids result from oxidation of sulfides present in sour water. Fixed ammonia can be eliminated by adding its molar equivalent of caustic to the top of the stripping column. Caustic addition does not interfere with sulfide removal. Recommended techniques for measuring cyanide and sulfide concentrations in sour waters are inadequate. Ammonia concentration may be overestimated when the recommended procedure is used because ammonia can be generated from organic nitrogen compounds which are present in refinery sour waters.

PB80-203805 PC **A06**/MF **A01**
Ionics, Inc., Watertown, MA.
Solar Powered Electrodialysis. Part I. Design of a Solar Powered Electrodialysis System for Desalting Remote, Brackish Water Sources.
Final rept.
Dec 79, 172p W80-06001, OWRT-C-80350-S(8576)(1)
Contract DI-14-34-0001-8576

An evaluation was undertaken of alternative designs of a solar powered electrodialysis (SPED) system for a desalting application that is typical of the brackish water sources in the southwestern United States. The designs are evaluated relative to total water costs for an average water production of 4,000 gallons per day where the solar isolation averages 24 million joules per square meter per day (10 hours of collection) and the feed water contains 2,200 parts per million of dissolved solids. The optimal design, at current F.O.B. costs for a photovoltaic (PV) array of $10 per peak watt, minimizes the electrical storage requirements by matching the electrical duty of the desalting plant to the electrical output of the PV array. Including the requirements for well pumping (200 foot depth), the total water cost is $13.90/Kgal. At $5 per peak watt, the water cost drops to $12.00/Kgal. If well pumping is not required, the water cost can be further reduced to $9.60/Kgal. At $5 per peak watt, the water costs for the SPED plant and a generator powered plant are equal when the cost of fuel at location is $1.70 per gallon. Diagrams of the plant layout, process flow sheet and control circuit are included.

PB80-204605 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC.
The Thermochemical Properties of the Uranium-Halogen Containing Compounds.
Interim rept.,
Vivian B. Parker. Jul 80, 173p NBSIR-80-2029
Sponsored in part by International Atomic Energy Agency, Vienna (Austria).

A detailed analysis and evaluation of the thermochemistry of the uranium-halogen containing compounds is presented, with a tabular summary of the thermochemical properties given. The properties given, where data are available, are in the enthalpy of formation, delta Hf, Gibbs energy of formation, delta Gf, entropy, S, Heat capacity C(p), all at temperature 298.15K, and the enthalpy of formation at K 0, delta Hf (0), and the enthalpy difference, H (298)-H (0). The values are consistent with the CODATA Key Values for thermodynamics. The analysis of the uranium-halogen containing compounds includes some vaporpressure equations and C(p) equations. Some thermal functions which are not readily available in the accessible open literature are presented in the Appendix for compounds that required their use. The tabular summary of delta Hf, delta Gf, includes the values for those uranium compounds which were necessary for this evaluation.

PB80-204720 PC **A14**/MF **A01**
National Training and Operational Technology Center, Cincinnati, OH.
Effluent Monitoring Procedures: Nutrients.
Student reference manual,

Audrey Donahue Kroner. Jun 76, 312p EPA-430/1-76-006
Supersedes PB-261 290.

A manual is provided for students in a chemistry course designed for the treatment plant operator or technician who is required to monitor effluent discharges under a National Pollutant Discharge Elimination System permit, and who has had little or no previous experience in wastewater analysis. The procedures are for phosphorus, chemical oxygen demand, Kjeldahl Nitrogen, Ammonia, Nitrate and Nitrite as Nitrogen, oil and grease. Also given are procedures for related basic skills, such as using a spectrophotometer and preparing calibration graphs.

PB80-204753 Not available NTIS
National Bureau of Standards, Washington, DC.
Perturbed Rydberg Series: Relationship Between Quantum-Defect and Configuration-Interaction Theory.
Final rept.,
F. H. Mies. Nov 79, 11p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Physical Review, A. General Physics 20, n5 p1773-1783 Nov 79.

In this paper theory of a single Rydberg series perturbed by an interloping state is examined. General analytic expressions are presented which apply both to the bound-state regions and to the autoionizing regions above the Rydberg ionization limit. The parameters are expressed in terms of configuration-interaction matrix elements, which can be calculated a priori. There is no restriction to weak-perturbation theory, and the wave function and all its associated properties, such as transition moments, can be extracted. Explicit calculations are presented for the Cd(5s nd)1(D)2 series perturbed by the Cd(5 double p) 1(D)2 valence state, and excellent results are obtained.

PB80-205065 Not available NTIS
National Bureau of Standards, Washington, DC.
Oscillator Strengths for Thallium Calculated Using a Semiempirical Relativistic One-Electron Central-Field Model Potential.
Final rept.,
J. N. Bardsley, and D. W. Norcross. 1980, 9p
Contract DOE-EA-77-A-01-6010
Pub. in Jnl. of Quantitative Spectroscopy and Radiative Transfer 23, p575-583 1980.

The results of calculations for oscillator strengths, radiative transition probabilities, and excited state lifetimes are presented and compared with those of other calculations and measurements. The agreement with measured oscillator strengths is generally quite good. The importance of core polarization effects for the diffuse series is demonstrated. The significance of the results for measurements of parity-nonconserving effects due to weak neutral currents is discussed.

PB80-205081 Not available NTIS
National Bureau of Standards, Washington, DC.
The Charge Distribution of 12C.
Final rept.,
J. W. Lightbody, Jr., X. K. Maruyama, S. Penner, S. P. Fivozinsky, and L. S. Cardman. 7 Apr 89, 4p
Sponsored in part by Department of Energy, Washington, DC., and National Science Foundation, Washington, DC.
Pub. in Physics Letters 91B, n2 p203-206, 7 Apr 80.

The authors report the results of a precision absolute elastic electron scattering experiment on carbon from which they determined the shape of the ground-state charge distribution and the rms charge radius to an accuracy significantly better than heretofore achieved.

PB80-205107 Not available NTIS
National Bureau of Standards, Washington, DC.
Direct Detection of the Product Vibrational-State Distribution in the Associative Detachment Reaction Cl + H HCl(v)+e.
Final rept.,
T. S. Zwier, M. M. Maricq, C. J. S. M. Simpson, V. M. Bierbaum, and G. B. Ellison. 21 Apr 80, 4p
Grants NSF-CHE76-22600, NSF-PHY-79-04928
Sponsored in part by Air Force Office of Scientific Research, Bolling AFB, DC.
Pub. in Physical Review Letters 44, n16 p1050-1053, 21 Apr 80.

The initial product vibrational-state distribution is obtained for the thermal associative-detachment reaction, Cl(-) + H yields HCl(nu = 0,1,2) + e, produced by infrared chemiluminescence in a flowing afterglow. The ratio of HCl(nu = 2) to HCl(nu = 1) population formed in the reaction is (N sub nu) = 2/(N sub nu) = 1 = 0.60 + or - 0.03. Comparison of the total emission intensity to that from a reaction of similar exothermicity suggests that HCl(nu = 0) formation may be small.

PB80-205115 Not available NTIS
National Bureau of Standards, Washington, DC.
Spectroscopy and Photophysics of CF2A1B1-X1A1 System.
Final rept.,
D. S. King, P. K. Schenck, and J. C. Stephenson. 1979, 15p
Contract DOE-EA-72-A-01-6010
Pub. in Jnl. of Molecular Spectroscopy 78, p1-15 1979.

Laser excited single vibronic level (SVL) fluorescence and SVL fluorescence excitation spectra of the low pressure vapor phase CF(2) A-X transition are reported.

PB80-205123 Not available NTIS
National Bureau of Standards, Washington, DC.
Vibrational Product State Distributions of Ion-Molecule Reactions by Infrared Chemiluminescence: Cl(-)+HBr,HI HCl(v)+BR(-),I(-).
Final rept.,
T. S. Zwier, M. M. Maricq, C. J. S. M. Simpson, V. M. Bierbaum, and G. B. Ellison. 15 May 80, 11p
Grants NSF-CHE76-22600, NSF-PHY79-04928
Sponsored in part by Air Force Office of Scientific Research, Bolling AFB, DC.
Pub. in Jnl. of Chemical Physics 72, n10 p5426-5436, 15 May 80.

The initial vibrational product state distribution is obtained for the thermal associative detachment reaction, Cl(-) + H yields HCl(v=0,1,2) + e, using infrared chemiluminescence in a flowing afterglow. The ratio of HCl(v=2) to HCl(v=1) population formed in the reaction is N(v=2)/N(v=1) = 0.60 + or - 0.03. Comparison of the total emission intensity to that from a reaction of similar exothermicity suggests that HCl(v=0) formation may be small.

PB80-205149 Not available NTIS
National Bureau of Standards, Washington, DC.
High-Resolution Infrared Spectrum of the 859- and 1711-cm-1 Bands of Carbony1 Sulfide (OCS).
Final rept.,
A. G. Maki, W. B. Olson, and R. L. Sams. 1980, 17p
Contract NASA-L-81242A
Pub. in Jnl. of Molecular Spectroscopy 81, p122-138 1980.

The nu(1) and 2 nu(1) bands of OCS have been measured using grating spectrometers and a tunable diode laser spectrometer. Preliminary wavenumbers for OCS absorption lines useful for calibrating tunable laser systems are given for the wavenumber intervals 825 to 885/cm and 1665 to 1737/cm. Effective band constants are given for these bands.

PB80-205255 PC **A06**/MF **A01**
GCA Corp., Bedford, MA. GCA Technology Div.
Comparison of Four Leachate-Generation Procedures for Solid Waste Characterization in Environmental Assessment Programs.
Final rept. May 79-Jan 80,
Daniel E. Bause, and Kenneth T. McGregor. May 80, 107p EPA-600/7-80-118
Contract EPA-68-02-3129

The report gives results of an evaluation of four leachate-generating procedures in terms of their general applicability, reproducibility, compatibility with environmental assessment methods, and leaching characteristics. The generated leachates were analyzed for nine metals by atomic absorption, and for F(-), Cl(-), and SO4(--) by ion chromatography. Seven energy process wastes (oil shale, FBC waste, two flyashes, boiler slag, scrubber sludge, and hopper ash) were extracted to evaluate the general applicability of the leachate tests. The ASTM methods had the best reproducibility, and the EP method, the poorest. The EP and CAE procedures leached the largest quantities of trace metals from the wastes. However, based on the total metal concentraion in the sample, the leachate methods generally extracted < 1%. The EP and ASTM-B methods caused some problems with flameless AA analyses. Based on the RCRA criteria, five of the energy wastes would be classified as hazardous by at least one leachate procedure. Se usually exceeded the threshold value for the leachate. Based on this study, the ASTM-A and CAE procedures are preferred for leachate generation. Regardless of the leachate-generating method selected for waste characterization, the experimental procedure must be defined more precisely with respect to preparation, preservation, and other aspects.

PB80-208887 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Table of Recommended Rate Constants for Chemical Reactions Occurring in Combustion,
Francis Westley. Apr 80, 123p NSRDS-NBS-67
Sponsored in part by Department of Energy, Washington, DC. Library of Congress catalog card no. 79-607159.

A table of recommended rate constants for gas phase chemical reactions occurring in combustion is presented. Specifically, it gives in tabular form the values of the parameters for the modified Arrhenius equation k = AT sup B exp (-E/RT). The table covers reactions occurring in the combustion, oxidation, and decomposition of aliphatic saturated or unsaturated C1 to C10 hydrocarbons, alcohols, aldehydes, ketones, thiols, ethers, peroxides, amines, amides and their free radicals, as well as the reactions of O, O2, H, H2, OH, H2O, H2O2, N, N2, NO, N2O, NO2, N2O4, N2O5, S, S2, SH, SO, SO2, SOH, NS, with each other. The table includes 169 first order reactions, 782 second order reactions, and 57 third order reactions. There are 1770 entries covering 1008 distinct chemical reactions. These recommendations have been taken from eleven evaluations and critical reviews published between 1970 and 1976. The papers examined by the evaluators extend from the nineteen fifties up to - and including - 1975.

PB80-209117 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Standard Reference Materials: A Reference Method for the Determination of Lithium in Serum.
Final rept.,
Rance A. Velapoldi, Robert C. Paule, Robert Schaffer, John Mandel, and Lawrence A. Machlan. Jul 80, 119p NBS-SP-260-69
Library of Congress catalog card no. 80-600091.
Prepared in cooperation with Hartford Hospital, CT., New England Deaconnes Hospital, Boston, MA., California Univ., Loc Angeles. Dept. of Pathology, and Center for Disease Control, Atlanta, GA.

A reference method was established for the determination of serum lithium based on flame atomic absorption spectroscopy (FAAS). Its accuracy was evaluated by comparing the values obtained by use of the method in 14 laboratories against the results obtained by a definitive analytical method based on isotope dilution-mass spectrometry (IDMS). Ten serum pools with lithium concentrations in the range 0.534 to 2.9554 mmol/L were analyzed. Manual and semiautomated pipetting alternatives were tested using sample sizes of 4.00 and 2.00 mL, respectively. The laboratories used several different FAAS instruments. The results showed that the standard error for a single laboratory's bias of about 2.0 percent over the range of serum lithium concentrations studied. These values are within the accuracy and precision goals that had been set. The calibration curve data showed excellent linearity over the total concentration range, with 24 of 25 curves having standard deviations of fit of 0.025 mmol/L or less. With appropriate experimental design, the reference

method may be used to establish the accuracy of field methods as well as to determine reference lithium values for pooled sera.

PNL-2786 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Processing of Waste Solutions from Electrochemical Decontamination.
L. A. Charlot, R. P. Allen, H. W. Arrowsmith, and J. L. Hooper. Sep 79, 52p
Contract EY-76-C-06-1830

The use of electropolishing as a decontamination technique will be effective only if we can minimize the amount of secondary waste requiring disposal and economically recycle part of the decontamination electrolyte. Consequently, a solution purification method is needed to remove the dissolved contamination and metal in the electrolyte. This report describes the selection of a purification method for a phosphoric acid electrolyte from the following possible acid reclamation processes: ion exchange, solvent extraction, precipitation, distillation, electrolysis, and membrane separation. (ERA citation 05:007493)

RFP-2943 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Measurement of Plutonium and Americium in Molten Salt Residues.
F. X. Haas, J. L. Lawless, W. E. Herren, and M. E. Hughes. 1979, 5p CONF-791117-17
Contract EY-76-C-04-3533
ANS topical conference, Kiawah Island, SC, USA, 26 Nov 1979.

The measurement of plutonium and americium in molten salt residues using a segmented gamma-ray scanning device is described. This system was calibrated using artificially fabricated as well as process generated samples. All samples were calorimetered and the americium to plutonium content of the samples determined by gamma-ray spectroscopy. For the nine samples calorimetered thus far, no significant biases are present in the comparison of the segmented gamma-ray assay and the calorimetric assay. Estimated errors are of the order of 10 percent and is dependent on the americium to plutonium ratio determination. (ERA citation 05:008902)

RFP-2955 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Analysis of Rocky Flats Soils for Six Radionuclides by a Sequential Method.
J. R. Stevens, D. R. Guhlow, T. F. Rees, and K. J. Grossaint. 1979, 19p CONF-791049-15
Contract EY-76-C-04-3533
23. conference on analytical chemistry in energy technology, Gatlinburg, TN, USA, 9 Oct 1979.

A method for the sequential analysis of Rocky Flats soils for six actinides of interest was developed to facilitate the large number of radionuclide analyses. The isotopes determined were: exp 238 U, exp 235 U, exp 234 U, exp 232 Th, exp 230 Th, exp 228 Th, exp 237 Np, /sup 239/240/Pu, exp 241 Am, and exp 244 Cm. The method included addition of tracer isotopes for each actinide, pyrosulfate fusion to help solutize minerals and decompose organic matter, sequential separation by cation and anion exchange techniques, extraction into thenoyltrifluoroacetone (TTA)/organic phase, and subsequent counting of alpha activity by pulse height analysis. The efficiency of recovery for tracer isotopes ranged from 40% for curium, to 95% for plutonium. The detection limits for the method were determined at 0.2 disintegrations per minute per gram (DPM/g) of soil for thorium, uranium, neptunium, and plutonium. The limits were a factor of three higher (0.6 DPM/g) for americium and curium, primarily because of inefficient extraction of these components by TTA. The sequential analysis was developed into a routine laboratory procedure to be used when multi-element soil analyses were requested. (ERA citation 05:004776)

RHO-SA-81 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Facility for the Analysis of Radioactive Samples by Inductively Coupled Plasma Spectroscopy.
C. S. Homi, and R. M. Manabe. Oct 79, 18p
CONF-791049-21
Contract EY-77-C-06-1030
23. conference on analytical chemistry in energy technology, Gatlinburg, TN, USA, 9 Oct 1979.

A 29-channel polychromator and a scanning monochromator are used to determine over 60 elements by inductively coupled plasma (ICP) spectroscopy. The addition of a sample hood, special torch containment box, and an off-gas scrubber system will allow the analysis of low- to intermediate-level radioactive samples. The simultaneous multi-element analysis capabilities of the ICP reduces sample handling and total analysis time. Consequently, the potential for radiation exposure to personnel will be reduced. (ERA citation 05:008904)

SAN-0034-240-T1 PC **A02**/MF **A01**
California Univ., Santa Cruz.
Photo Induced Electron Transfer Reactions in Mixed Organic-Inorganic Systems. Final Report.
G. S. Hammond. 12 Sep 79, 6p
Contract EY-76-S-03-0034-240

Fluorescence quenching of two organic cations by metal ions was studied: N-methyl-acridinium and triphenyl pyraninium. The fluorescence of both cations was quenched by metal ions but reactivities in quenching did not correlate uniquely to the oxidation potentials of the metal cations. (ERA citation 05:003457)

SAN-0034-240-T2 PC **A02**/MF **A01**
Allied Chemical Corp., Morristown, NJ. Corporate Research Center.
Photo Induced Electron Transfer Reactions in Mixed Organic-Inorganic Systems. Final Report.
G. S. Hammond. 12 Sep 79, 6p
Contract EY-76-S-03-0034-240

Fluorescence quenching of N-methyl-acridinium and triphenyl pyranium cations by metal ions (Fe, Cu, Ni) was studied. The fluorescence of both cations is quenched by metal ions, but reactivities in quenching do not correlate uniquely to the oxidation potentials of the metal cations. (ERA citation 05:008942)

SAND-79-0549C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Characterization of Hydrogen Species on Metal-Oxide Surfaces by Electron-Stimulated Desorption: TiO sub 2 and SrTiO sub 3 *.
M. L. Knotek. 1979, 15p CONF-790956-2
Contract EY-76-C-04-0789
Conference on non-traditional approaches to the study of the solid-electrolyte interface, Snowmass, CO, USA, 23 Sep 1979.

The hydrogen species on TiO sub 2 and SrTiO sub 3 have been characterized using the site specificity of electron-excited Auger Stimulated Desorption (ASD). Hydrogen is found to be bonded to surface Ti's in hydride-type bonds, to subsurface or bridge-bonded O's in a hydroxyl-like bond, or be part of a surface hydroxyl. On SrTiO sub 3 the Ti-H and surface OH species are also found plus a high density of Sr-H and very little Sr-OH bonding. The general features of ASD, both electron- and photon-excited, are discussed. (ERA citation 05:004759)

SAND-79-1226C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Application of Radiography to Coal Liquefaction.
D. G. Sample, and M. G. Thomas. 1979, 16p
CONF-791008-2
Contract EY-76-C-04-0789
ASNT fall conference, St Louis, MO, USA, 15 Oct 1979.

X-radiographic techniques have been applied to the investigation of coal and coal liquefaction systems. The analysis of catalysts used in coal liquefaction by wave-length and energy dispersive analyses has identified major contaminants and their distributions. Catalyst tags can be identified and isolated from large numbers of untagged catalysts using film radiography. Another application of film radiography has been the identification of failed systems. A radiation gage has been employed to measure mineral matter in coal and to identify phase boundaries in dynamic systems. The latter is currently being tested for the real time analysis of flow regime in coal liquefaction apparatus. (ERA citation 04:052483)

SAND-79-1477C PC **A03**/MF **A01**
IBM Research Div., San Jose, CA.
Thermopower and Transport Properties of AsF sub 5 Doped Polyacetylene.
J. F. Kwak, W. D. Gill, R. L. Greene, K. Seeger, and T. C. Clarke. 1979, 35p CONF-790395-1
Contract EY-76-C-04-0789
Symposium on structure and properties of highly conducting polymers and graphite, San Jose, CA, USA, 29 Mar 1979.

Measurements of the thermoelectric power versus temperature of (CH)/sub x/ doped with various concentrations of AsF sub 5 are reported. These reflect the semiconductor-metal transition at approx. 1% doping. The pristine thermopower is consistent with the conductivity-derived activation energy of 0.35 eV, and a residual defect/impurity carrier concentration of 0.1%. An analysis of the conductivity based on these data indicates that, while the disorder is certainly important, it is not the cause of the transition. (ERA citation 05:003397)

SAND-79-1971C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Infrared-Visible Double-Resonance Ionization Spectroscopy.
P. Esherick, and R. J. M. Anderson. 1979, 7p
CONF-791055-1
Contract EY-76-C-04-0789
Annual meeting of the Optical Society of America, Rochester, NY, USA, 8 Oct 1979.

For the first time multiphoton ionization of a molecule (NO) was observed as a result of the sequential excitation by a tunable infrared laser and a tunable dye laser. These double-resonance experiments have made it possible to obtain multiphoton ionization spectra (MIS) of specific rotational levels of the molecule selected by the initial IR transition. The following applications of this technique are demonstrated: a means of simplifying complex multiphoton ionization spectra of molecules, a means of sensitively and selectively detecting IR absorption of molecules, a means of studying the dynamics of relaxation of molecules in excited rotation-vibration states. 5 references. (ERA citation 05:002018)

SAND-79-2305C PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia. Dept. of Physics.
Bonding, Shake-Up Energies and Shake-Up Intensities in Cr(NO) Sub 4.
G. Loubriel. 1979, 14p CONF-791013-9
Contract EY-76-C-04-0789
26. national vacuum symposium, New York, NY, USA, 2 Oct 1979.

The results of SCF-X alpha -multiple scattering calculations of the electronic structure of Cr(NO) sub 4 in its neutral ground state and in several positive-ion states are reported. This allows a description of the bonding of NO to the Cr atom, explains how the screening of core holes (created in a XPS measurement) is affected and yields the N/sub ls/ shake-up spectrum. There is good agreement with the experimental valence region photo-emission spectra peak positions and with the skake-up peak positions and intensities. (ERA citation 05:009413)

TKK-V-A5 PC **A03**/MF **A01**
Helsinki Univ. of Technology, Espoo (Finland). Lab. of Process Metallurgy.
Isothermal Sintering Kinetics of UOsub(2+X).
Thesis (D.Techn.),
J. Rekola. Nov 78, 49p TKK-DISS-408
U.S. Sales Only.

The isothermal sintering kinetics of UOsub(2+x) were studied by measuring the densification rate in an optical dilatometer developed for this purpose. The sintering was conducted at constant temperature by using thin UOsub(2+x) compacts with a constant nonstoichiometry. The oxygen partial

pressure in the sintering atmosphere was continuously measured by a stabilized ZrO sub 2 solid electrolyte cell, particular attention being paid to the starting conditions of the ideal sintering. An empirical densification rate equation that describes the sintering kinetics within a large range was verified: density range 52 - 83% of the theoretical density, temperature range 1000 degC - 1550 degC, nonstoichiometry range Psub(O sub 2)=10sup(-15.3)-10sup(-8.4)Pa, at 1100 degC, sintering time 12 s - 281 h. The effect of temperature on the sintering rate was compatible with the values reported in the literature for the effect of temperature on the uranium self-diffusion, the determined activation energy being 432 +- 13 kJ/mole. It was also noted that the uranium self-diffusion is suitable as the dominating factor in the sintering kinetics of UOsub(2+x). The rise in temperature from 1000 degC to 1550 degC increased the densification rate constant k 40-fold, and the change in oxygen partial pressure from Psub(O sub 2)=10sup(-15.3) to Psub(O sub 2)=10sup(-8.4) Pa at 1100 degC 4-fold. At 800 degC and at composition UOsub(2.1) a sintering rate was measured that corresponds to the sintering rate of a stoichiometric compact at 1320 degC. With the method applied in the present study and the verified empirical equation, the effect of the various factors on the sintering of the uranium dioxide compacts used as fuel elements can be studied accurately. (Atomindex citation 11:496545)

UCID-15644-79-1 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
General Chemistry Division. Quarterly Report, January-April 1979.
J. Harrar. 18 Jun 79, 56p
Contract W-7405-ENG-48

The following were studied: scavenging behavior of NO sub 3- and methyl viologen, fluorescent lifetimes of dibromobimane and thiols, spectral determination of tricresyl borate, salicylaldehyde method for differentiation of primary and secondary amines, ammonia-gas-sensing electrodes, automated manometric CHN analyzer, computer program for calibration of graphite furnace atomic absorption spectrophotometer, contamination of alumina insulator, organic additives for stabilizing colloidal silica in hypersaline geothermal brine, x-ray fluorescence analysis of geological samples, dissolution of geothermal scale, and characterization of enzyme-catalyzed reactions (alkaline phosphatase). (ERA citation 04:053467)

UCID-18258 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Recommended Values for the Vapor Pressure of Uranium.
O. H. Krikorian. 15 Nov 75, 11p
Contract W-7405-ENG-48

Thermodynamic functions of U liquid and gas are tabulated for 1405 to 3200 exp 0 K. The vapor pressure of U is calculated and tabulated for 1800 to 3200 exp 0 K and graphed at 2400 to 3000 exp 0 K. Vaporization rate, vapor density, and average atomic velocity are also tabulated. (ERA citation 05:000218)

UCRL-81306 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Determining the Copper-Complexing Capacity of Known Organic Compounds and Soluble Organic Matter in Natural Waters by Differential Pulse Anodic Stripping Voltammetry Peak-Potential Shift.
J. Y. Katekaru, P. E. Pullen, and F. L. Harrison. 1978, 17p CONF-780902-17
Contract W-7405-ENG-48
American Chemical Society meeting, Miami, FL, USA, 10 Sep 1978.

A new method for determining the copper-complexing capacity of known organic compounds in distilled water and soluble organic matter in natural aquatic systems is reported. This method is based on the differential pulse anodic stripping peak potential shift. The complexing capacity in natural waters thus determined is a measure of copper complexation upon the addition of the metal; it does not include copper already complexed. We found complexing capacities for glycine at pH 6.8 and nitrilotriacetic acid (NTA) at pH 6.8 in distilled water to be 4.31 x 10 exp -2 mol Cu/mol glycine and 1.01 mol Cu/mol NTA, respectively. Complexing capacity results from natural freshwater at pH 4.5, 2.00 x 10 exp -6 M Cu, and from natural seawater at pH 7.6, 295 x 10 exp -8 M Cu, as well as theoretical considerations and methodology are discussed. (ERA citation 04:034359)

UCRL-82127 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Shock Compression of Liquid Methane and the Principle of Corresponding States.
W. J. Nellis, A. C. Mitchell, M. Ross, and M. van Thiel. 24 Jul 79, 7p CONF-790709-8
Contract W-7405-ENG-48
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

The principal Hugoniot of liquid methane has been measured between 5 to 43 GPa and a doubly-shocked state has been measured at 91 GPa. The repulsive pair potential for methane and argon are demonstrated to obey the principle of corresponding states. (ERA citation 04:050669)

UCRL-82270 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Effects of Cellular Structure on the Behavior of Gaseous Detonation Waves under Transient Conditions.
P. A. Urtiew, and C. M. Tarver. 16 Jul 79, 39p CONF-790828-2
Contract W-7405-ENG-48
International colloquium on gas-dynamics of explosions and reactive systems, Gottingen, F.R. Germany, 20 Aug 1979.

Increased concern about the detonability of gaseous mixtures in unconfined clouds renewed our interest in the behavior of the detonation process under various transient conditions, such as a non-uniform distribution of pressure, temperature, or composition. In readjusting itself during such a transient state, the process may either survive and continue as a detonation wave or may weaken so fast that it transforms into a simple deflagration wave. A similar transient condition may be imposed on the wave by letting it pass through an area change. Here again, the wave may either survive or weaken to a point of its extinction. Assuming that the cellular structure of the detonation wave is responsible for its existence and its uniqueness, the effect of variation in the cross-sectional area of the tubes on the cell size and on the survival of the detonative process during the transition were investigated. Comparison was made with the results of other investigators who performed similar experiments for different reasons. the results show that it is not the tube diameter nor the initial pressure of the medium that controls the survival of the wave but that it is (1) the number of cells available to endure losses from flow effects generated by the transient conditions and (2) the number of cells remaining to regenerate new cells to revive the detonation process. (ERA citation 04:050656)

UCRL-83343 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Tunable Coherent Uv to Near IR Generation Using High Order Stimulated Raman Scattering.
J. A. Paisner, and R. S. Hargrove. 27 Aug 79, 20p CONF-791047-1
Contract W-31-109-ENG-38
11. annual electro optics/laser conference and exposition, Anaheim, CA, USA, 23 Oct 1979.

A remarkably simple method to generate coherent vuv radiation is described. The technique is based on stimulated high order Raman scattering in H sub 2 under tight focusing conditions. Using this method with tunable dye and rare gas halide pump lasers pulsed light output to 1238 Å was produced. The important features of this process are discussed as well as its applications and extensions to the infrared region. 9 references. (ERA citation 05:001997)

UFPB-DF-2/78 PC **A03**/MF **A01**
Universidade Federal da Paraiba, Joao Pessoa (Brazil). Dept. de Fisica.
Bose-Einstein Condensation in a One-Dimensional System at Constant Pressure.
A. N. Chaba, and A. M. Ferreira. Jul 78, 29p
U.S. Sales Only.

Using techniques developed by Greenspoon and Pathria and by Chaba and Pathria, a rigorous asymptotic analysis of the onset of Bose-Einstein condensation in a finite one-dimensional system at constant pressure, under Dirichlet boundary conditions and mixed boundary conditions, is carried out. The role of the finite size corrections arising from a modification of the density of states of the system, as well as from the discreteness of the single-particle energy levels, is discussed. The heat capacity Csub(P) passes through a smooth maximum and the volume becomes subextensive at the critical temperature Tsub(C). Somewhat below Tsub(C)(infinite), the volume of the system, together with Csub(P), becomes O(Nsup(1/3)). We also discuss the behaviour of the system when it is cooled at constant volume below Tsub(C) and compare the results of the present study with those of the two-dimensional and the three-dimensional systems. (Atomindex citation 10:428440)

UM-P-78-4 PC **A02**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Activation Analysis of Dosimetric LiF (TLD-100) with Cyclotron Produced Neutrons.
M. A. Chaudri. 1978, 10p
U.S. Sales Only.

Activation analysis of two different batches of dosimetric LiF (TLD-100) has been carried out using neutrons from the Hammersmith Cyclotron. The concentration of Mg, which is the major doping material in LiF, has been determined at 155 +or- 10 and 115 +or- 10 p.p.m. in the two batches. The upper limits for the presence of A1, Ca, Mn and Fe in these batches are also estimated to be 20, 20, 2 and 2 p.p.m. Titanium could not be detected with the available neutron beam from the Cyclotron. The results obtained are compared with the patent specifications of the Harshaw Chemical Company, the manufacturers of TLD-100, and with the results obtained at other laboratories using different techniques. (Atomindex citation 10:440305)

WIS-Ph-78/9 PC **A03**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Analytic Extensions of Monte Carlo Calculations.
E. A. Remler. 1978, 32p
U.S. Sales Only.

The term Quasi-Classical is defined to apply to a large class of fundamentally equivalent approximations currently used for reactions involving complex quantum mechanical systems. Their relation to the underlying quantum mechanical problem is clarified. Monte-Carlo calculations play a central and paridigmatic role within this class. Analytic formulae for inclusive cross-sections involving simple integrals over functions obtained through a Monte-Carlo calculation are presented. These are of a completely obvious nature but apoarently have not been previously presented. They should greatly increase the convergence rate and range of applicability of Monte-Carlo calculations and of Quasi-Classical calculations in general. The method of derivation allows straightforward generalization to arbitrary final states. (Atomindex citation 10:427726)

ZfK-374 PC **A02**/MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German D.R.).
Interaction of the Superheavy Elements Near to Z = 114 with Metals.
B. Eichler. Oct 78, 19p
In German.
U.S. Sales Only.

The theoretical heats of formation of ordered solid equiatomic alloys and the partial heat of mixing at infinite dilution of the elements 112 - 115 in molten metals have been calculated using a calculation model (MEIDEMA). Necessary data of the superheavy elements (bulk modulus, molar volume, electronegativity parameter) have been deter-

mined by extrapolation. Thermochromatographic experiments have shown that a relation exists between the interactions of metals in macroscopic binary systems and the adsorption behaviour of one component in carrier free state on the surface of the stationary metal phase. It is suggested to use these interactions between the volatile superheavy elements and the stationary metal phase to the selective adsorption - chromatographic separation -and identification processes. It is refered to possible natural association of these elements with elementary occured metals. (Atomindex citation 10:432697)

7E. Radio and Radiation Chemistry

AD-A086 693/9 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Photochemistry and Photocatalytic Activity of a Polynuclear Metal Carbonyl Halide: Dodecacarbonyltetrahydridotetraruthenium,
James L. Graff, and Mark S. Wrighton. 28 Sep 79, 8p Rept nos. TR-18, TR-20-ONR
Contract N00014-75-C-0880
Pub. in Jnl. of the American Chemical Society, v102 p2123-2125 1980.

No abstract available.

AED-Conf-78-274-006 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Determination of the Radionuclide Purity of Mo 99/Tc 99M.
P. Hoffmann, and H. Braun. 1978, 8p CONF-7810177-11
In German.Lecture meeting on principles and applications of nuclear-, radio-, and radiation chemistry, Lindau, F.R. Germany, 16 Oct 1978.
U.S. Sales Only.

The determination of the radionuclide purity is more closely investigated by the example of the radionuclide generator. exp 99 Mo/sup(99m)Tc. A distinction is made between alpha -activities, gamma -activities and pure beta -emitters. The determination of alpha -activities is particularly important in those radionuclides obtained from fission products. The alpha -activity should not exceed the 10 exp 9 th part of the total activity. Regarding the measurement of such small activity shares, it is important to know which alpha -activities can still be measured next to the high beta and gamma activities. Flow-counter tubes in the alpha -plateau are most suitable. In order to determine the gamma -activity impurities, it is necessary to find out what share of foreign activities in the gamma -spectrum of exp 99 Mo and sup(99m)Tc can be quantitatively determined. In certain cases it may be necessary to separate off the main activity or the side activities in question. It is relatively complicated to determine impurities of pure beta -emitters. These must be chemically separated, identified and quantitatively determined. One must however, take into account that the total time needed for the determination of all impurities must be very much shorter than the half-life of the radionuclide. The results of the investigations so far are discussed. (Atomindex citation 10:458005)

IFIN-CS-2-1978 PC **A02**/MF **A01**
Institutul de Fizica si Inginerie Nucleara, Bucharest (Romania).
EPR Spectra of Some Irradiated Polycrystalline Perrhenates.
N. G. Zaitseva, M. Constantinescu, R. Georgescu, and O. Constantinescu. Oct 78, 16p
U.S. Sales Only.

An EPR study of the paramagnetic centers formed by gamma , electron and neutron irradiation of the NaReO sub 4 and KReO sub 4 was made. In the EPR spectra of the powder samples irradiated gamma , with electrons and neutrons, the presence of three types of paramagnetic centers was observed. From the EPR parameters, the centers were attributed to the ReOsub(4)sup(.), ReOsub(3)sup(.) and ReOsub(2)sup(.) radicals respectively. The lower intensity of the spectra observed by KReO sub 4 samples irradiation showed a higher radioresistance of the KReO sub 4 than that of NaReO sub 4 . A radiolytical scheme taking into account the paramagnetic centers formation was proposed. (Atomindex citation 11:496351)

INIS-mf-5284 PC **A03**/MF **A01**
Instituto Nacional de Energia Nuclear, Mexico City. Dept. de Quimica Nuclear.
Nuclear Chemistry, Radiochemistry and Radiation Chemistry.
50p CONF-781265-(Sum.)
Symposium on nuclear chemistry, radiochemistry and radiation chemistry, Mexico City, Mexico, 13 Dec 1978.
U.S. Sales Only.

Separate abstracts were prepared for individual papers. (Atomindex citation 11:496298)

JINR-R-4-11446 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Simple Approach to the Three-Body Problem in Mesic Atom Physics.
L. I. Ponomarev, L. N. Somov, and M. P. Faifman. 1978, 14p
In Russian.
U.S. Sales Only.

A simple approach has been proposed which makes it possible to obtain good results in the two-level approximation of the adiabatic method for the three-body problem. The coupling energy of mesic molecules and various characteristics of p mu +p and d mu +d scattering have been calculated. The comparison with previously obtained results has been made. (Atomindex citation 10:427852)

PB80-201213 PC **A02**/MF **A01**
Boston Univ., MA. Dept. of Chemistry.
Photochemical Conversion of Solar Energy.
Quarterly progress rept. 1 Jul-30 Sep 76,
Norman N. Lichtin. Dec 76, 17p NSF/RANN/SE/AER-72-03579/A05/76/3, NSF/RA-761857
Grant NSF-AER72-03579
See also report dated 28 Oct 76, PB-262 450.

Studies demonstrating the engineering efficiency for converting incident solar flux into electrical power are reported. The first phase investigated electrical characteristics of the totally illuminated thin layer (Tl-TL) SnO2/Pt iron-thionine photogalvanic cell. These experiments measured cell output using a solar simulator at the light source; calculation of sunlight engineering efficiency (S.E.E.) = 0.036% using a selected SnO2 anode and light from a tungsten lamp; determination of dependence of cell output on temperature and thionic acetate (TH3(+)pss; the photostationary concentration of leucothionine; and electrode materials. The second phase studied solvent effects on output of the Tl-TL iron thionine SnO2/Pt cell and on the dynamics of the photostationary state. These experiments compared electrical outputs together with the composition and dynamics of the photostationary state in binary and ternary aqueous organic solvent mixtures. Solutions of Brij-35, a non-ionic surfactant, were compared to a polycationic surfactant with respect to current output, solubility and dimerization of thionine. Electrochemical aspects of the degradation of CdSnO4 cathodes in the iron-thionine cell were studied. Results are presented in graphic and tabular form.

SAND-79-0736C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Chemical Storage of Solar Energy with Photoelectrochemical Cells.
D. S. Ginley. 1979, 6p CONF-790515-1
Contract EY-76-C-04-0789
International assembly on energy storage, Dubrovnik, Yugoslavia, 27 May 1979.

The theory of operation of photoelectrochemical cells is briefly described and problems in the development of optimum electrodes are discussed. (ERA citation 04:054378)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A086 270/6 PC **A02**/MF **A01**
Johns Hopkins Univ Baltimore MD
A Radio Whale Tag.
Technical rept.,
William A. Watkins, Douglas Wartzok, Hugh B. Martin, III , and Romaine R. Maiefski. 16 Jun 80, 19p Rept no. TR-21
Contracts N00014-75-C-0701, NAS2-9300
Pub. in Marine Science, n10 p227-241 n.d. Prepared in cooperation with Woods Hole Oceanographic Institution, MA, Contract N00014-74-C-0262, Rept. no. WHOI-CONTRIB-4259.

No abstract available.

AD-A086 271/4 PC **A02**/MF **A01**
Johns Hopkins Univ Baltimore MD
Abstracts of Papers Presented at Recent Conferences.
Technical rept.,
G. Carleton Ray, Douglas Wartzok, and Francis H. Fay. 16 Jun 80, 7p Rept no. TR-22
Contract N00014-75-C-0701
Presented at the Alaska Science Conference (29th), Aug 78 and the Biennial Conference on the Biology of Marine Mammals, (3rd), Seattle, WA, 7-11 Oct 79.

The abstracts of the following presentations are included in this technical report: (1) Reproductive behavior of the Pacific walrus in relation to population structure. Presented at the 29th Alaska Science Conference, August 1978, and (2) Phocid spectral sensitivity curves. Presented at the Third Biennial Conference on the Biology of Marine Mammals, October 1979.

AD-A086 462/9 PC **A05**/MF **A01**
Naval Ocean Systems Center San Diego CA
Trident Biological Surveys: SUBASE Bangor (July 1977 and June 1978) and Indian Island Annex (January, May 1974 and June 1978). Supplement 2.
Technical rept.,
H. W. Goforth, T. J. Peeling, M. H. Salazar, and J. G. Grovhoug. Dec 79, 87p Rept no. NOSC/TR-513
Supplement 2 to Rept. no. NUC-TP-510, AD-A026 200.

In July 1977 and June 1978, biological surveys of the Trident Submarine Support Facility, SUBASE Bangor, Washington were conducted. The primary objective was to collect selected biological data for an assessment of the marine environmental conditions during a period of facilities construction. In January and May 1974 and June 1978, a series of biological surveys were conducted at Indian Island Annex, Washington. The objective of the first two surveys was to collect seasonal biological baseline data from which the impact of proposed pier construction could be predicted. The third survey was designed to collect biological data for monitoring environmental conditions during on-going pier construction. The major effort of these surveys was directed towards quantifying the abundance and distribution of commercially/recreationally important species of marine fishes and molluscs. Other biotic components of the ecosystem were surveyed according to their relative abundance and/or importance in the food web of other species. The general conclusion supported by the data collected from a total of eight surveys is that the marine life along the SUBASE shoreline appears to be unchanged by Trident construction. Any and

all biotic fluctuations appear to be natural and are in synchronization with those observed at the offbase control stations. There have been no rare or endangered species or critical marine habitats affected by construction activities. Adverse impact has been limited to the biota physically disrupted by the mechanical process of pier construction.

AD-A086 600/4 PC A04/MF A01
San Diego State Univ Foundation CA
Productivity and Diversity of Phytoplankton in Relation to Copper Levels in San Diego Bay.
Final rept. Jun 78-Dec 79,
Sandra M. Krett Lane. Mar 80, 74p NOSC-TR-533
Contract N00123-79-D-0449

Biomass, productivity, and composition of phytoplankton communities were assessed at three sites in San Diego Bay over a period of 1 year. Phytoplankton assemblages taken from regions of low copper levels (less than 1.0 ppb) were characterized by high productivity, biomass and diversity. Samples taken from regions of high copper levels (greater than 3.0 ppb) were less diverse but maintained high biomass and productivity. Phytoplankton tolerance to various copper concentrations was demonstrated by laboratory tests. These findings suggest that the phytoplankton assemblages found in copper-contaminated regions are more tolerant to high copper levels. (Author)

PB80-200082 PC A03/MF A01
New Mexico Water Resources Research Inst., Las Cruces.
Irradiance, Temperature, and Salinity Effects on Growth, Leaf Anatomy, and Photosynthesis of 'Distichlis spicata' (L.) Greene,
Paul R. Kemp, and Gary L. Cunningham. Apr 80, 41p WRRI-121, W80-05798, OWRT-B-058-NMEX(1)
Contract DI-14-34-0001-8101
Prepared in cooperation with New Mexico State Univ., Las Cruces. Dept. of Biology.

The effects of irradiance, temperature, and salinity on growth, net CO2 exchange, and leaf anatomy of Distichlis spicata were investigated in controlled environment chambers. When plants were grown at low irradiance, growth rates were significantly reduced by high substrate salinity or low temperature. However, when plants were grown at high irradiance, growth rates were not significantly affected by temperature or salinity. The mechanisms by which Distichlis spicata tolerates salt appear to be closely coupled to the utilization of light energy. Salt-induced leaf succulence is of questionable importance to gas exchange at high salinity in this C4 species.

PB80-201684 PC A16/MF A01
Tereco Corp., College Station, TX.
Ecological Aspects of the Upper Continental Slope of the Gulf of Mexico.
Final rept.,
Willis E. Pequegnat, Rezneat M. Darnell, Bela M. James, E. A. Kennedy, and Linda H. Peguegnat. 30 Jan 76, 371p BLM/YM/ES-76/4
Contract DI-08550-CT4-12

This report describes the faunal assemblages of the deep-water benthic communities associated with the upper continental slope of the northern Gulf of Mexico, primarily in the area between Brownsville, Texas, and Cape San Blas, Florida.

PB80-201700 PC A17/MF A01
Center for Natural Areas, South Gardiner, ME.
A Summary and Analysis of Environmental Information on the Continental Shelf and Blake Plateau from Cape Hatteras to Cape Canaveral (1977). Volume II. Master Bibliography, Index, Acknowledgements.
Final rept.
Aug 79, 382p BLM/YM/ES-79/27
Contract DI-AA550-CT7-39
See also Volume 1, Book 1, PB80-184096.

A 12-month study by the Center for Natural Areas (CNA) was conducted to collect and analyze published, unpublished, and raw data as well as ongoing research programs from 1974 to present, relative to the marine environment of the outer continental shelf (OCS) and the Blake Plateau from Cape Hatteras, North Carolina to Cape Canaveral, Florida.

PB80-202336 PC A02/MF A01
Environmental Monitoring and Support Lab.-Cincinnati, OH.
Portable, Hand-Operated Cycle Sieve For Washing Macroinvertebrate Samples.
Journal article,
William T. Mason, Jr. Jan 76, 5p EPA-600/J-76-103
Pub. in The Progressive Fish-Culturist, v38 n1 p30-32 Jan 76.

Methods for speeding the collection and analysis of macroinvertebrate samples are urgently needed to increase sampling precision and to reduce cost. The cycle sieve described in the present paper is practical for most freshwater work from small boats because it is light and portable, the major components are available commercially, and the parts are easily assembled. Because the samples are washed by hand at boatside, no special fixtures or energy sources are required. The entire sample is washed at one time, without risk of losing material, and the sieving effort is standardized.

PB80-202757 PC A04/MF A01
Maryland Univ., Solomons. Chesapeake Biological Lab.
Results of Benthic Respiration/Sediment Nutrient Flux at Chalk Point, Patuxent Estuary.
Annual rept. May 78-Jun 79,
W. R. Boynton, W. M. Kemp, C. G. Osborne, and E. Spalding. Jun 80, 62p UMCEES-80-33-CBL, PPSP-CP-80-4

A study of nutrient dynamics and productivity was conducted at the Chalk Point Power Station. Significantly higher benthic nutrient fluxes were observed for phosphorus, ammonium, nitrate, and nitrite at the power plant. Productivity was significantly less at the plant site.

PB80-202989 PC A03/MF A01
Cetacean Research Associates, San Diego, CA.
Gray Whales, 'Eschrichtius robustus', during the 1977-1978 and 1978-1979 Winter Seasons in Laguna San Ignacio, Baja California Sur, Mexico.
Final rept.,
Steven L. Swartz, and Mary Lou Jones. Jul 80, 42p MMC-79/04
Contract MM1533497-8

Gray whales, Eschrichtius robustus, were studied at Laguna San Ignacio, Baja California Sur, Mexico during the 1977-1978 and 1978-1979 breeding seasons. Peak populations of approximately 300 whales (not including calves) were reached in February of each year. Whales other than females with calves vacated the lagoon by mid-March while females with calves continued to increase until April. Cows with calves exclusively occupied the lagoon from mid-March through the end of each study period in mid-April. The occupation of the lagoon by all whales in 1979 was approximately 14.9 days later than in 1978. Whales were most active in the early morning and late afternoon, utilizing the incoming tides to move into the lagoon and the falling tides to move towards the entrance.

PB80-203482 PC A05/MF A01
New York State Dept. of Environmental Conservation, Albany. Div. of Marine Resources.
A Study of the Striped Bass in the Marine District of New York State.
Completion rept. 1 Apr 76-31 Mar 79,
Bryon H. Young. May 80, 95p NOAA-80060402

Between April of 1976 and March of 1979, a total of 9,791 striped bass were netted from western Long Island Sound, the Hudson River and the heated plume at the Northport Power Station using beach seines and gill nets. Of these, 1,854 striped bass were collected in western Long Island Sound, 1,701 of which were tagged and released. Most of these fish were less than two years old. In the Hudson River, 7,920 young-of-the-year and yearling striped bass were collected; 1,017 of this collection were tagged and released. In addition, 17 striped bass were collected, tagged and released in the heated plume at the Northport Power Station.

PB80-203516 PC A05/MF A01
Gulf Coast Research Lab., Ocean Springs, MS.
Rearing and Stocking Striped Bass - Mississippi Gulf Coast.
Completion rept. Sep 76-Sep 79,
Thomas D. McIlwain. May 80, 97p NOAA-80060403

The two primary objectives of this project were to establish a population of South Carolina striped bass by stocking striped bass into Mississippi coastal streams and to establish a population of striped bass which will utilize the coastal streams, the estuaries and open Gulf of Mexico waters by stocking striped bass, which are known to migrate to the open sea. During this project 1,200,527 South Carolina striped bass fingerlings were reared and/or stocked into Biloxi Bay and 35,948 sea-run striped bass fingerlings were reared and stocked into St. Louis Bay. Six hundred and eighty fish were reported or returned to project personnel.

PB80-208580 PC A03/MF A01
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Prediction of Chemical Concentrations in the Blowdown of the Proposed Vienna Unit No. 9,
William D. Stanbro, Debra A. Pyrch, and Edward M. Portner. Feb 80, 30p PPSP/JHU/PPSE-8-4

This report describes the predicted chemical concentrations in the blowdown of the proposed Vienna Unit No. 9. Effects studied include concentration of river salts, dissolved oxygen, waste water system discharges, scale formation chemicals, chlorine and corrosion products.

8B. Cartography

AD-A086 502/2 PC A08/MF A01
Perceptronics Inc Woodland Hills CA
A Task-Based Analysis of Information Requirements of Tactical Maps.
Annual technical rept. 16 Mar 78-15 Mar 79,
Betty M. Landee, Michael G. Samet, and Dennis R. Foley. Aug 79, 163p PATR-1063-79-4-2, ARI-TR-397
Contract DAHC19-78-C-0018

A task-based approach for specifying and analyzing map information requirements was developed and demonstrated. A review of selected literature concerning the mapping process included methods for selecting environmental data to be shown on a map. Seven tactical tasks, representing common battlefield functions performed by different users and echelons were sampled and analyzed in depth. A military role-playing and doctrinal verification procedure was used to divide tasks into subtasks so that corresponding information requirements could be specified. Each subtask in turn was broken down into basic tactical questions about the environment. The data required to answer each question defined the information categories and levels of detail necessary for successful task completion. The resulting map-related information requirements were synthesized to generate representative map development guidelines. This synthesis--which emphasized information about vegetation, road networks, and built-up areas--was accomplished across tasks to identify those specific information needs which show either prominent commonality or uniqueness with respect to different tasks and user groups. Within the framework of these task-based comparisons, examples illustrate the types of implications that can be derived from the task-based analysis of information requirements.

AD-A086 793/7 MF A01
Durham Univ (England) Dept of Geography
Statistical Characterization of Altitude Matrices by Computer. Report 5. Terrain Analysis: Program Documentation.
Progress rept.,
Margaret Young, and Ian S. Evans. 1978, 29p
Grant DA-ERO-591-73-G0040
See also Report 6, AD-A076 558.
Availability: Microfiche copies only.

The terrain analysis system of programs derives, from a matrix of altitude data, the descriptive char-

acteristics of gradient, aspect, and profile and plan convexity for the central point of each 3 x 3 square set of adjacent grid points. The characteristics are derived algebraically from a quadratic fitted by the least squares method to each set of 9 points. For the whole matrix, the mean, standard deviation, skewness and kurtosis are found for the calculated altitude, gradient and profile and plan convexities. The vector mean of the aspect is found and also the regression of each of the other characteristics with the sine and cosine of the aspect. The descriptive characteristics are displayed in several ways, viz, histograms, scatter diagrams and line printer density maps. A map is produced on the graph plotter giving the direction and magnitude of the gradient at each grid point. The programs are written in FORTRAN; they call SPSS and MIDAS routines and run under the MTS system on the NUMAC IBM 370/168 computer.

N80-27782/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, VA.
Airborne Laser Topographic Mapping Results from Initial Joint NASA/US Army Corps of Engineers Experiment.
W. B. Krabill, J. G. Collins, R. N. Swift, and M. L. Butler. Jun 80, 36p NASA-TM-73287

Initial results from a series of joint NASA/US Army Corps of Engineers experiments are presented. The NASA Airborne Oceanographic Lidar (AOL) was exercised over various terrain conditions, collecting both profile and scan data from which river basin cross sections are extracted. Comparisons of the laser data with both photogrammetry and ground surveys are made, with 12 to 27 cm agreement observed over open ground. Foliage penetration tests, utilizing the unique time-waveform sampling capability of the AOL, indicate 50 cm agreement with photogrammetry (known to have difficulty in foliage covered terrain).

8C. Dynamic Oceanography

AD-A086 437/1 Not available NTIS
Harvard Univ Cambridge MA Div of Applied Sciences
The Accuracy, Efficiency, and Stability of Three Numerical Models with Application to Open Ocean Problems,
D. B. Haidvogel, A. R. Robinson, and E. E. Schulman. 4 Dec 78, 53p Rept no. CONTRIB-115
Contract N00014-75-C-0225, Grant NSF-OCE76-00869
Availability: Pub. in Jnl. of Computational Physics, v34 n1 p1-53 Jan 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 486/8 PC **A02**/MF **A01**
SACLANT ASW Research Centre La Spezia (Italy)
Surface Slicks and Near-Surface Variability: A Literature Review and some Measurements in the Gulf of Cadiz,
Brian Wannamaker. 15 Jan 80, 15p Rept no. SACLANTCEN-SM-133

Bands of smooth water, or 'Slicks' commonly occur on the sea surface. The size scale and orientation of arrays of slicks may be indicative of subsurface flows due to internal waves, Langmuir circulation, or fronts. Under summer conditions in the Gulf of Cadiz the sea temperature has been observed to exhibit sudden negative temperature spikes of 1.4 C at 4m depth on size scales of slicks. Slicks may indicate conditions of variability in air/sea interaction processes and near-surface sound transmission. (Author)

AD-A086 613/7 PC **A02**/MF **A01**
Brown (Neil) Instrument Systems Inc Cataumet MA
A Three-Axis Acoustic Current Meter for Small Scale Turbulence,
Kenneth D. Lawson, Jr., Neil L. Brown, David H. Johnson, and Robert A. Mattey. 1975, 7p
Contract N00014-75-C-0113
Prepared in cooperation with Johns Hopkins Univ., Laurel, MD, Contract N00017-72-C-4401.

Design on the current meter described in this paper began early in 1975 in an attempt to develop an instrument having characteristics suitable for horizontal profiling of small scale turbulence in the ocean. The result of this program was a three-axis instrument suitable for mounting on the bow of a submersible and capable of resolving turbulence phenomena as small as 10 cm with frequency components up to 50 Hz. Included in the overall instrument package was a conductivity-temperature-depth (CTD) system and three-axis accelerometer. During a single scan interval of .01 s all three axes of the acoustic current meter, the three axes of the accelerometer and the conductivity, temperature, and pressure sensors are digitized, resulting in 900 measurements every second. The accelerometer and velocimeter outputs are digitized to 14 bits and the CTD to 16 bit resolution.

AD-A086 614/5 Not available NTIS
Brown (Neil) Instrument Systems Inc Cataumet MA
Performance Assessment of Advanced Ocean Current Sensors,
Gerald F. Appell. 1 Nov 77, 4p
Contract N00014-75-C-0113
Availability: Pub. in IEEE Jnl. of Oceanic Engineering, vOE-4 n1 p1-4 Jan 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 627/7 Not available NTIS
Florida State Univ Tallahassee Geophysical Fluid Dynamics Inst
Open Boundary Conditions in Rotating Fluids,
Alejandro L. Camerlengo, and James J. O'Brien. 17 Aug 78, 24p Rept no. GFDI-CONTRIB-0150
Contract N00014-80-C-0076
Availability: Pub. in Jnl. of Computational Physics, v35 n1 p12-35, 15 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 643/4 Not available NTIS
Florida State Univ Tallahassee Dept of Oceanography
Effects of Bottom Topography and Density Stratification on the Formation of Western Boundary Currents. Part II. Inflow-Outflow Model,
Nobuo Suginohara. 17 Jul 79, 10p
Contract N00014-80-C-0076
Availability: Pub. in Jnl. of the Oceanographical Society of Japan, v35 n6 p224-232 Jan 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 692/1 PC **A02**/MF **A01**
Rosenstiel School of Marine and Atmospheric Science Miamai FL
Measurements in the Source Region of the Somali Current during the Monsoon Reversal,
Walter Dueing, and Friedrich Schott. 1 Sep 77, 14p Rept no. 2
Contract N00014-75-C-0173, Grant NSF-OCD74-21435
Pub. in Jnl. of Physical Oceanography, v8 n2 p278-289 Mar 78.

No abstract available.

PB80-207285 PC **A04**/MF **A01**
National Advisory Committee on Oceans and Atmosphere, Washington, DC.
A Report to: The President and The Congress by the National Advisory Committee on Oceans and Atmosphere, Annual Report (3rd) June 28, 1974.
28 Jun 74, 66p NACOA-11

The National Advisory Committee on Oceans and Atmosphere (NACOA) wishes to focus attention on the essential role occupied by the ocean-atmosphere interaction in short- and long-range aspects of climate prediction and energy use and development. Once again there is lack of institutional support for many matters having to do with oceans. The emphasis is on energy production. Little is devoted to understanding what the major global effects of energy use might be. The need to focus the management of the national oceanic affairs is dealt with in a major chapter of this report. In a third chapter, NACOA treats a subject of perennial concern to the Nation and of annual concern to the Committee: Law of the Sea. In a final chapter a rundown on topics NACOA has asked others to take up is given.

8D. Geochemistry

JEN-449 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Determination of Rubidium and Strontium in Geological Materials by X-Ray Fluorescence Spectrometry.
M. Roca. 1979, 19p
In Spanish.
U.S. Sales Only.

In order to determine whole-rock ages by the Rb/Sr procedure, an X-ray fluorescence spectrometry method for the determination of both elements has been developed. The samples are pressed into boric acid backed and ringed pellets with this material as a binding agent. Matrix corrections are made following the determination of the mass absorption coefficients, based on the intensity of the Compton-scattered peak of Mok alpha or Mok beta sub(1,3). The U.S. Geological Survey granodiorite GSP-1 is used as a reference standard. Spectral-line interferences have been carefully studied and the empirical correction factors determined. A basic language program for calculating the Rb and Sr concentration and the Rb/Sr ration has been written. (Atomindex citation 11:496237)

RHO-SA-59 PC **A15**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Evaluation of Dike-Flow Correlations Indicated by Geochemistry, Chief Joseph Swarm, Columbia River Basalt.
S. M. Price. Jun 78, 347p
Contract EY-77-C-06-1030
Thesis. Submitted to Univ. of Idaho, Moscow.

A geochemical examination of dikes of a part of the Chief Joseph swarm, southeastern Washington-northeastern Oregon, and proximate Columbia River Basalt flows was conducted to evaluate the reliability of using comparative geochemistry to establish dike-flow correlations. An initial assessment of chemical variation, based on the major, minor, and selected trace element analyses of 48 dikes of the Grande Ronde River-Joseph Creek area (formerly known as the Grande Ronde swarm), revealed that although intradike chemical variation is minimal, interdike chemical variation is significant. Of the dikes surveyed, 32 are of Yakima chemical type, eight of Dodge chemical type, one of Roza chemical type, one of Umatilla chemical type, five of Pomona chemical type, and one of Lolo chemical type (chemical type nomenclature of Wright and others, 1973; Swanson and others, 1977). (ERA citation 05:006261)

8E. Geodesy

AD-A086 489/2 PC **A03**/MF **A01**
Phoenix Corp McLean VA
Geophysical Applications of Moving-Base Gravity Gradiometry.
Interim rept. Nov 79-Apr 80,
R. D. Brown. 15 Apr 80, 45p
Contract N00014-79-C-0409

The current state-of-the-art in gravity gradiometer development for moving platforms is more than adequate for geophysical survey application. An examination of the gravity gradients of several types of geological features shows that an aircraft mounted instrument with 10 Eotvos unit sensitivity and 10 second response time will be sufficient to measure geological anomalies with scale lengths

as small as 5 km. Instruments under development at two different laboratories presently have better than 10 Eotvos sensitivity at 10 seconds integration time. Within 3 to 5 years, these instruments could be used in geophysical surveys. However, research must be performed in the processing of gravity gradiometer data for geophysical parameter recovery to take full advantage of the information content of this data. Gravity gradiometry can yield much sharper definition of the shape, size, and depth of geological structures than can gravity data, because of the more rapid attenuation of the gradients with distance. This is analogous to the sharper focus and narrowed field of view provided by telescopic optics compared to the naked eye. Most of the published work on processing of gravity gradient data ignores the wealth of information contained in the gradients and recommends simply integrating a single gradient component to obtain gravity or deflection of the vertical along the survey track.

AD-A086 835/6 PC **A05**/MF **A01**
Analytic Sciences Corp Reading MA
A Fast Estimation Algorithm for Two-Dimensional Gravity Data (GEOFAST),
Kevin S. Tait. 15 Nov 79, 86p TASC-TR-868-1-1, SCIENTIFIC-2, AFGL-TR-80-0016
Contract F19628-77-C-0152

This report describes an algorithm for the efficient computation of minimum-variance estimates from large amounts of two-dimensional gravity data. The method (called GEOFAST for 'geodetic fast estimation') is based on the fast Fourier transform and takes advantage of the underlying structure of the statistical models in the frequency domain. An approximate solution is obtained in a number of computer operations proportional to N log sub 2, where N is the number of data points and the proportionality constant is controlled by the desired level of accuracy. Results are presented from two test cases, using GEOS-3 radar altimeter data to estimate mean gravity anomalies, which verify the efficiency and accuracy of the algorithm. (Author)

N80-27732/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Geoid Anomalies in the Vicinity of Subduction Zones.
D. C. McAdoo. May 80, 46p NASA-TM-80678
Submitted for Publication.

The regional geoid of the southwest Pacific is matched reasonably well by results from a model of the upper mantle density structure (including slabs) associated with subduction zones of the region. Estimates of the geoid are obtained from Geos-3 and Seasat radar altimeter data. These data are very well suited to the task of detecting intermediate wavelength (600-4000 km) geopotential variations. Actually, subducting slabs can be expected to produce primarily intermediate and longer wavelength variations. Gravimetric profiles across trench/island arc complexes resolve primarily short wavelengths. The model represents subducting slabs as thin surfaces of anomalous mass per unit area. These surfaces are positioned using published seismicity results which detail the configuration of the Benioff zones. Crustal effects are ignored. Effects due to the contrast between the young thermal lithosphere of the behind-arc regions (marginal basins) and the older lithosphere seaward of the trench are modelled. Results indicate that the New Hebrides slab possesses an average areal density anomaly of about 300,000 gm/sq cm. This is about three times that which is estimated for the Tonga-Kermadec slab. Additional modelling suggests that slabs worldwide may be an important source of large, long wavelength gravity highs; i.e., they may contribute substantially to geopotential power of harmonic degree as low as three or four up to twenty or more.

8F. Geography

AD-A086 332/4 PC **A08**/MF **A01**
Earth Science Consulting and Technology Corp Costa Mesa CA
Multi-Source Image Analysis.
Final rept.,
David D. Steller, Micheal R. Mel, Debra J. Shiroma, Julie A. Sowrna, and William Muir. Dec 79, 166p ETL-0208
Contract DAAK70-78-C-0180
Report on Radar, Thermal Infrared and Panchromatic Image Interpretation.

For the purposes of this study, multi-source image analysis is defined as the utilization of imagery from panchromatic photography, radar and thermal infrared systems for providing military geographic information. The imagery was limited to sets available from a variety of governmental and commercial sources. Effort was made to obtain images from all three sensor systems, but at some test sites only one or two types were utilized. Sensor characteristics were evaluated in relationship to the targets of interest and sensor keys determined. Several useful enhancement techniques were utilized to emphasize feature parameters. Comparison interpretation using all three image types provided valuable complementary target information. (Author)

AD-A086 794/5 PC **A05**/MF **A01**
SRI International Menlo Park CA
Analysis of a Triangulated Irregular Network (TIN) Terrain Model for Military Applications.
Final rept. Sep 77-Feb 80,
Henry A. Olender. Feb 80, 92p
Contract N00014-77-C-0698

This report describes a comparative evaluation of two digital terrain models (DTMs) in the context of tactical terrain analysis problems in Marine Corps ground combat operations. The two DTMs are the triangulated irregular network (TIN) model and the uniform rectangular grid (URG) model. The URG model represents terrain by simply encoding the terrain elevations on a uniform grid while the TIN model fits a series of irregular triangular facets to the terrain. The TIN model is a surface-specific model because distinctive surface features, such as peaks, pits, passes, ridgelines, and valley-lines, control the selection of triangular facets. In general, fewer points (triangle vertices) are required to model a given surface with a TIN compared to the URG. Average digital data storage requirements are reduced, although significant digital encoding overhead must be included in the TIN model. The comparative evaluation was performed by selecting several geographical regions of interest and two tactical test problems; the determination of visible ground areas from given observation points, and the determination of accessible ground areas to generic types of vehicles. TIN and URG models of the selected regions were then obtained and separately applied to the solution of the two test problems. Digital data base storage requirements, computer resources used, and computer resource measure was CPU time, and the problem solution performance measure was defined as the areal measure errors in the resulting visibility and slope threshold maps.

N80-27872/4 PC **A04**/MF **A01**
Ohio State Univ., Columbus. Dept. of Geodetic Science.
Reducing the Error of Geoid Undulation Computations by Modifying Stokes' Function.
C. Jekeli. May 80, 55p NASA-CR-163316, REPT-301
Contract NGR-36-008-161

The truncation theory as it pertains to the calculation of geoid undulations based on Stokes' integral, but from limited gravity data, is reexamined. Specifically, the improved procedures of Molodenskii et al. are shown through numerical investigations to yield substantially smaller errors than the conventional method that is often applied in practice. In this improved method, as well as in a simpler alternative to the conventional approach, the Stokes' kernel is suitably modified in order to accelerate the rate of convergence of the error series. These modified methods, however, effect a reduction in the error only if a set of low-degree potential harmonic coefficients is utilized in the computation. Consider, for example, the situation in which gravity anomalies are given in a cap of radius 10 deg and the GEM 9 (20,20) potential field is used. Then, typically, the error in the computed undulation (aside from the spherical approximation and errors in the gravity anomaly data) according to the conventional truncation theory is 1.09 m; with Meissl's modification it reduces to 0.41m, while Molodenskii's improved method gives 0.45 m. A further alteration of Molodenskii's method is developed and yields an RMS error of 0.33 m. These values reflect the effect of the truncation, as well as the errors in the GEM 9 harmonic coefficients. The considerable improvement, suggested by these results, of the modified methods over the conventional procedure is verified with actual gravity anomaly data in two oceanic regions, where the GEOS-3 altimeter geoid serves as the basis for comparison. The optimal method of truncation, investigated by Colombo, is extremely ill-conditioned. It is shown that with no corresponding regularization, this procedure is inapplicable.

8G. Geology and Mineralogy

AD-A086 536/0 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Specific Character of Magnetic Field and Development of Underwater Ridges of Arctic Basin,
A. M. Karasik, R. M. Demenitskaya, and V. G. Shelovanov. 16 Jun 80, 18p Rept no. FTD-ID(RS)T-0797-80
Unedited machine trans. of mono. Geologiya i Perspektivy Neftegazonosnosti Sovetskoy Arktiki, Leningrad, 1972 p51-55.

No abstract available.

E80-10141 PC **A02**/MF **A01**
London Univ. (England).
HCMM (Heat Capacity Mapping Mission) and LANDSAT Imagery for Geological Mapping in Northwest Queensland,
M. M. Cole, and D. J. Edmiston. 1980, 10p
NASA-CR-163159

The author has identified the following significant results. Photographic prints made from negatives of Day Visible and Day IR cover of selected areas were compared with enhanced color composites gnerated from LANSAT computer compatible tapes and films. For geological mapping purposes, HDMM imagery is of limited value. While large scale features like the Mikadoodi anticlinorium, contrasting lithological units, and major structures may be distinguished on Day Visible and Day IR cover, the spectral bands are too broad and the resolution too coarse even for regional mapping purposes. The imagery appears to be most useful for drainage studies. Where drainage is seasonal, sequential imagery permits monitoring of broad scale water movement while the Day IR imagery yields valuable information on former channels. In plains areas subject to periodic change of stream courses, comparable IR cover at a larger scale would offer considerable potential for reconstruction of former drainage patterns essential for the correct interpretation of geochemical data relative to mineral exploration.

E80-10143 PC **A03**/MF **A01**
Bureau de Recherches Geologiques et Minieres, Orleans (France).
Spatial Thermal Radiometry Contribution to the Massif Armoricain and the Massif Central (France) Litho-Structural Study.
Rept. for Aug 79-Feb 80,
Jean-Yves Scanvic. 1980, 28p NASA-CR-163161
Sponsored in part by Centre National d'Etudes Spatiales, Paris (France).

The author has identified the following significant results. Although the limited number of images received did not permit construction of a thermal inertia map, important geological details were obtained in the areas of lithology and tectonics. Interpretation of day, night, and seasonal imagery resulted in differentiating broad calcareous and dolomitic units in the Causse Plateau. In the Massif amoricain, some granite massifs were delineated which were not observed by LANDSAT. Neotectonic faults were also revealed.

INIS-mf-5346 MF **A01**
Laboratorium voor Isotopen-Geologie, Amsterdam (Netherlands).

Morphology and U-Pb Ages of Zircons from the High-Grade Metamorphic Precambrian in the Sirdal-Oersdal Area, SW Norway.
J. B. W. Wielens. 1979, 94p
U.S. Sales Only. Microfiche copies only.

The U-Pb systematics of seven suites of zircons and two apatites were investigated in an attempt to obtain data about the pre-Sveconorwegian geochronology. Very little was known about this earlier history, as previous studies have shown that the high-grade metamorphism has obliterated most of the older Rb-Sr record. Three samples were investigated from the augengneisses, two from the pyroxene syenites, one garnetiferous migmatite and one magnetite-ilmenite-zircon veinlet cross-cutting the charnockitic migmatites. (Atomindex citation 11:496634)

LBL-10387 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Secondary Minerals Found in the Cores DC2 A1 and DC2 A2 Taken from the Grande Ronde Basalt Formation, Pasco Basin, Washington.
L. S. Teague. Jan 80, 36p
Contract W-7405-ENG-48

The results obtained for Task I are presented and discussed in this report. The subject of Task I is the study and identification of secondary mineral assemblages in two slant cores drilled off core DC2. The data were obtained from scanning electron microscopic (SEM/EDAX), x-ray diffraction (XRD), and thin section petrographic studies. In addition, an attempt was made to determine the lateral continuity of the secondary mineralization and the extent to which the fissures in this potential repository horizon were interconnected. Differences between the slant cores and DC2 may be due to variations in the vertical distribution of the samples and the fewer slant core samples studied. As a result, firm conclusions cannot be drawn regarding the depth dependence and relationship of mordenite precipitation to clinoptilolite dissolution. The limited data obtained in this and previous reports supports the preliminary conclusion that secondary mineralization is laterally continuous. Secondary mineral assemblages and morphologies in all cores are similar and no significant horizontal changes are observed. (ERA citation 05:023730)

NUREG/CR-1519 PC **A05**/MF **A01**
Geological Survey of Alabama, University.
General Geology, Geophysics, and Seismicity of Northwest Alabama.
Technical rept. Apr 79-Apr 80,
J. T. Kidd. Jun 80, 90p
Contract NRC-04-78-262

The Geological survey of Alabama and the U.S. Nuclear Regulatory Commission are making a study of the general geology, geophysics, and seismicity of that area in northwest Alabama that is located within a 200-mile radius of New Madrid, Missouri. Rocks exposed in the study area and penetrated in the subsurface range in age from Cambrian to Holocene. Numerous faults and folds have been reported in rocks as old as possible Precambrian and as young as possible the Cretaceous. Geophysical surveys in the study area show several anomalies. Of particular interest is the apparent shared location between a large gravity anomaly and a low geothermal gradient anomaly. Seismic data indicate the area is in a zone of negligible to moderate seismic risk but two earthquakes have been reported. Maximum earthquake intensities recorded for the study area based on all historical earthquakes affecting Alabama between 1811-1977 range from 4 to 7 (Modified Mercalli).

N80-27778/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Magsat Scientific Investigations.
R. A. Langel. May 80, 42p NASA-TM-80698
Submitted for Publication.

The Magsat spacecraft is providing the first global, vector magnetic survey. Investigations using the Magsat data are being carried out by scientists at NASA's Goddard Space Flight Center, at the U.S. Geological Survey of the Department of the Interior and by 32 selected investigators. Nineteen of the investigators are from the United States and 13 are from various foreign nations. The investigations described fall into four categories; (1) geomagnetic field modeling; (2) crustal magnetic anomaly studies; (3) investigations of the inner Earth: the core, mantle and core-mantle interface; and (4) studies of external current systems.

RHO-BWI-C-59 MF **A01**
Washington State Dept. of Natural Resources, Olympia.
Bibliography of the Geology of the Columbia Basin and Surrounding Areas of Washington.
G. B. Tucker, and J. G. Rigby. Jul 79, 543p
Contract AC06-77RL01030
Microfiche copies only.

In the fall of 1977, the Washington State Department of Natural Resources, Division of Geology and Earth Resources (WDGER), entered into a contract with the US Department of Energy, administered by Rockwell Hanford Operations (Rockwell) in Richland, Washington, as a principal contributor to a geologic study of feasibility of storing radioactive waste within Columbia River basalt. WDGER's responsibility was the production of this bibliography and a reconnaissance geologic map of the sediments overlying the Columbia River Basalt Group in the State of Washington. This bibliography is a compilation of all known published, unpublished, and open-file references dealing with geology and geophysics of the Columbia Basin of eastern Washington. The citations were obtained primarily from the WDGER and Washington State libraries; the Geo-Ref bibliographic system was also utilized. Because the WDGER portion of the study included preparation of a reconnaissance geologic map of surficial deposits in the Columbia Basin, available references dealing with this subject have been annotated. Many abstracts in the annotated section are quotations and have been copied directly from their respective publications. (ERA citation 05:023739)

RHO-BWI-SA-11 PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Bergmounds Along the Western Margin of the Channeled Scablands, South--Central Washington.
K. R. Fecht, and A. M. Tallman. Oct 78, 34p
CONF-7810145-1
Contract EY-77-C-06-1030
Geological Society of America annual meeting, Toronto, Canada, 23 Oct 1978.

Distinctive mounds of till occur 100 to 240 meters above the present Columbia River along the western margins of the Pasco and Quincy basins. These mounds were formed by melting of grounded icebergs after inundation of the basins by the catastrophic glacial Lake Missoula flood(s). Most of the bergmounds are circular in plan and range in size from small clusters of erratics to mounds 50 meters in diameter and up to 4 meters high. The detritus is composed predominantly of granite, slate, argillite, quartzite, gneiss, and basalt, with grain size ranging from clay-size paticles to boulders up to 3 meters intermediate diameter. The pebbles and cobbles are glacially polished and fine-grained clasts are often striated. The bergmounds can be grouped into 4 classes on the basis of clast lithology. The most commonly occurring bergmounds are composed of 85 to 100 percent granitic debris. Bergmounds exhibiting mixed lithologies are also common. Less common are bergmounds composed of greater than 85 percent basalt and mounds composed predominantly of quartzite. The bergmounds occur in groups and are rarely found as isolated mounds. The elevation and distribution of bergmounds are related to fluvial currents and depths of the flood waters with iceberg grounding in regions of slack water and/or eddy currents. (ERA citation 04:028170)

SAND-79-1119 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Compressibility of Granulated Rock Salt.
R. E. Stinebaugh. Aug 79, 75p
Contract EY-76-C-04-0789

Crushed rock salt will be used extensively at the Waste Isolation Pilot Plant as a material for backfilling underground openings. This document addresses one of the characteristics of crushed salt which must be known to assess the consequences of its usage, namely, compressibility. (ERA citation 05:001973)

SAND-79-1361 PC **A06**/MF **A01**
Sandia Labs., Albuquerque, NM.
FY79 Lava Lake Drilling Program - Geoscience Studies; Plans and Results.
J. L. Colp. Oct 79, 106p
Contract EY-76-C-04-0789

Fifteen experimental studies were planned for the geoscience studies portion of the FY79 Lava Lake Drilling Program at Kilauea Iki Lava Lake, Hawaii, grouped under headings of petrologic, thermal, strength, liquid/permeability, electrical, and other. This report gives a location, purpose, description, and feasibility analysis for each experiment. A results section for each experiment includes data gathered and analysis to date, where available. (ERA citation 05:002902)

SAND-79-1546C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Material Properties of Eleana Argillite: Extrapolation to Other Argillaceous Rocks, and Implications for Waste Management.
A. R. Lappin, and W. A. Olsson. 1979, 36p
Contract EY-76-C-04-0789

Results of a near-surface heater test in the Eleana argillite suggest the possibility that the high-temperature (> 100 exp 0 C) thermomechanical response of argillaceous rocks to waste emplacement may be dominated by behavior of expandable clays. Enough expandable clay is probably present in most argillaceous rocks to cause a similar response. In situ thermal conductivities may be markedly reduced by even small amounts of clay contraction, compensated by opening of pre-existing joints. A simple model predicts that such opening behavior may continue to operate for disposal at considerable depths, through several factors affecting this depth remain poorly defined at present. (ERA citation 05:009397)

VPI-SU-5648-3 PC **A14**/MF **A01**
Origin of the Winnsboro Granite by Crustal Anatexis.
B. B. Hanan, J,K. Costain, L. Glover, III, and A. K. Sinha. 1978, 301p

Arguments against greywacke being the source of Winnsboro granite are presented. (ERA citation 04:055642)

8H. Hydrology and Limnology

AD-A086 507/1 PC **A10**/MF **A01**
Iowa Inst of Hydraulic Research Iowa City
Suspended Sediment Modeling of Dredge-Disposal Effluent in the GREAT-II Study Reach.
J. L. Schnoor, A. R. Giaquinta, D. D. Musgrove, and W. W. Sayre. Mar 80, 241p Rept no. IIHR-72
Contract DACW25-78-C-0073

The objectives of this study were to: (1) Collect field data on suspended solids and turbidity during two dredge disposal operations on the Mississippi River; (2) Check the utility of the Schubel and Carter (1978) model for adequately describing the observed field data and modify, if possible, to reflect river conditions; (3) Examine other models available to describe the observed field data, including the numerical, computer solution of Weschler and Cogley (1977) (such models can be used to rapidly generate a number of simulations covering a spectrum of conditions expected in the Mississippi River); and (4) Develop a convenient, analytical solution for the prediction of suspended solids concentrations caused by hydraulically dredged sediment and compare the model results to field measurements. The scope of this modeling effort includes the utilization of existing dredge disposal mathematical models, both analytical and numerical, as well as the development of a new model. The new model is specifically derived for continuous nonpoint source, sidebank disposal type of operations such as commonly practiced in the upper Mississippi River. Suspended solids concentrations are predicted. This research grew out

of a larger dredging study by a multi-departmental, multi-disciplinary consortium called the Great River Environmental Action Team, GREAT II. The GREAT II study reach of the Mississippi River stretches from Guttenberg, Iowa to Saverton, Missouri.

AD-A086 719/2 PC **A10**/MF **A01**
Iowa Inst of Hydraulic Research Iowa City
Desorption of Pollutants from Mississippi River Sediments in the GREAT II Study Reach Lab Simulation Study,
J. L. Schnoor, J. L. Musterman, R. A. Fisher, D. W. Birks, and R. M. Noll. Mar 80, 221p
Contract DACW-25-79-C-0010

Recommendations resulting from this study include: (1) Sufficient elutriate tests have been performed to show that maintenance dredging of main channel sediments does not exceed water quality criteria. Attention should now be focused on water quality effects of opening sloughs and harbor dredging. (2) Sampling of the sediment interstitial water should be accomplished with corers to be more representative of the actual interstitial water. There must be no mixing with the overlying site water during sampling. (3) The partition coefficient gives an indication of the pollution potential of a particular pollutant. A range of partition coefficients for each pollutant of concern should be established for the different kinds of sediments found in the Mississippi River. (4) Further study of the kinetic model using other pollutants is required if the kinetics of the discharge plume are to be modeled. (5) In situ-sampling, during dredging, would facilitate calibration of the plume model. The model could then be verified under various conditions highly polluted sediment and clean water, clean sediment and polluted water, polluted sediment and water. and (6) Sediment samples cannot be preserved for oxygen uptake measurements for more than 1-2 days.

E80-10155 PC **A02**/MF **A01**
South Dakota State Univ., Brookings. Remote Sensing Inst.
HCMM (Heat Capacity Mapping Mission) Energy Budget Data as a Model Input for Assessing Regions of High Potential Groundwater Pollution.
Rept. for Jan-Mar 80,
Donald G. Moore, and J. L. Heilman. Mar 80, 9p
SDSU-RSI-80-03, NASA-CR-163172
Contract NAS5-24206

The author has identified the following significant results. Day thermal data were analyzed to assess depth to groundwater in the test site. HCMM apparent temperature was corrected for atmospheric effects using lake temperature of the Oahe Reservoir in central South Dakota. Soil surface temperatures were estimated using an equation developed for ground studies. A significant relationship was found between surface soil temperature and depth to groundwater, as well as between the surface soil-maximum air temperature differential and soil water content (% of field capacity) in the 0cm and 4cm layer of the profile. Land use for the data points consisted of row crops, small grains, stubble, and pasture.

PB80-199680 PC **A03**/MF **A01**
Caribbean Research Inst., St. Thomas, VI. Water Resources Research Center.
Sequential Use of Reclaimed Wastewater Destined for Aquifer Recharge.
Technical rept. Sep 76-Sep 78,
Henry H. Smith. Jun 79, 32p TR-4, W80-05801, OWRT-A-001-VI(1)
Contract DI-14-34-7100

Effluent from the advanced wastewater treatment plant in St. Croix, U.S. Virgin Islands, a water-deficient island, was used to recharge aquifers by use of spreading basins. Wells in the recharge area were monitored to determine changes in static levels and in quality. Results indicate an increase in the quantity of water in the aquifer and an upgrading in the quality of the effluent. An economic analysis showed the cost of recharge/recovery operations to be significantly less than the cost of desalination of sea water which supplies the major portion of water to the island.

PB80-200157 PC **A22**/MF **A01**
Geological Survey, Lincoln, NE. Water Resources Div.
Water Resources Data for Nebraska, Water Year 1979.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79. May 80, 515p USGS/WRD/HD-80/040, USGS-WDR-NE-79-1
See also report for Water Year 1978, PB80-117070. Prepared in cooperation with Nebraska Dept. of Water Resources, Lincoln., Nebraska Univ., Lincoln. Conservation and Survey Div., and Nebraska Natural Resources Commission, Lincoln.

Water resources data for the 1979 water year for Nebraska consist of records of stage, discharge, and water quality of streams; state and contents of lakes and reservoirs; and water levels and water quality in wells and springs. This report contains discharge records for 161 gaging stations; stage and contents for 10 lakes and reservoirs; water quality for 60 gaging stations, 10 ungaged stations, 34 partial-record flow stations, and 276 wells; and water levels for 63 observation wells. Also included are 7 crest-stage partial-record stations.

PB80-201023 PC **A03**/MF **A01**
Geological Survey, Trenton, NJ. Water Resources Div.
Plan of Study for the Northern Atlantic Coastal Plain Regional Aquifer System Analysis.
Water resources investigations,
Harold Meisler. Apr 80, 33p USGS/WRD/WRI-80/033, USGS/WRI-80-16

Sediments of Cretaceous to Holocene age compose the Northern Atlantic Coastal Plain aquifer system in an area of 50,000 square miles from North Carolina to New York. The aquifer system is the principal source of water supply for most of the area. About 1.4 billion gallons are withdrawn each day. Increasing pumpage has created problems such as declining water levels, saltwater intrusion, and land subsidence. The U.S. Geological Survey has begun a comprehensive study of the aquifer system that will define the geology, hydrology, and geochemistry of the system. This report describes the objectives, organization, and work plans of the study.

PB80-201148 PC **A04**/MF **A01**
Geological Survey, Albany, NY. Water Resources Div.
Techniques for Estimating Magnitude and Frequency of Floods on Rural Unregulated Streams in New York State Excluding Long Island.
Water-resources investigations (Final),
Thomas J. Zembrzuski, Jr., and Bernard Dunn. Jul 79, 74p USGS/WRD/WRI-80/029, USGS/WRI-79-83
Prepared in cooperation with New York State Dept. of Transportation, Albany, and New York State Dept. of Environmental Conservation, Albany.

Techniques are presented for estimating the magnitude and frequency of floods at ungaged sites on unregulated rural streams in New York, excluding Long Island. Discharge-frequency data and basin characteristics of 220 gaging stations in New York and adjacent states were used in multiple linear regression analyses to develop equations for floods that range in recurrence interval from 2 to 100 years. Separate equations were developed for northern, southeastern, and western regions of New York.

PB80-201775 PC **A03**/MF **A01**
Geological Survey, Rolla, MO. Water Resources Div.
Effects of Urban Runoff and Wastewater Effluent on Wilsons Creek and James River Near Springfield, Missouri.
Water-resources investigations (Final),
Wayne R. Berkas. Mar 80, 40p USGS/WRD/WRI-80/032, USGS/WRI-80-27
Prepared in cooperation with City of Springfield, MO., Sanitary Services.

Statistical analysis on water-quality parameters from James River upstream and downstream from the confluence of Wilsons Creek shows that there is a significant difference for all parameters except temperature and dissolved silica at the 0.05 probability level. Regression analysis shows correlation for discharge with dissolved sodium, dissolved chloride, and dissolved potassium, and for specific conductance with dissolved sodium, dissolved chloride, and dissolved sulfate at the station downstream from Wilsons Creek. This is due to the consistent quality of the effluent from the Southwest Wastewater Plant on Wilsons Creek. Water-quality monitor stations upstream and downstream from the wastewater plant indicate that effluent from the plant has a degrading effect on dissolved oxygen in Wilsons Creek and James River. Also, the monitors indicate that rainfall washes poor-quality water into Wilsons Creek from the urbanized Springfield area. Flood-frequency estimates were made, although it was not possible to fully account for urban effects because of scant data.

PB80-202328 PC **A09**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
Descriptive Water Quality for the Atchafalaya Basin, Louisiana,
Stephen C. Hern, V. W. Lambou, and J. R. Butch. Feb 80, 180p EPA-600/4-80-014

This report describes water quality in the Atchafalaya Basin in terms of geographical areas, seasonal patterns, and its relationships to water regimes and compares water quality in the Basin to water quality in other Louisiana and southeastern lakes. Emphasis in this report is given to water quality in the Atchafalaya Basin Floodway, i.e., that portion of the Atchafalaya Basin subject to frequent and prolonged natural overbank flooding and most subjected to hydrological modification by man. The key to the high productivity of the Floodway is the short, efficient, bacteria-detritus food chain. Organic matter processed through bacterial metabolism represents the foundation of the system. Nitrogen and phosphorus levels are sufficient for bacterial metabolism of organic matter, regardless of geographical area, season, or water level.

PB80-202484 PC **A02**/MF **A01**
Connecticut Univ., Storrs. Inst. of Water Resources.
Regulation of Land Use Practices for Areas Surrounding Aquifers - Economic and Legal Implications.
Project completion rept.,
M. M. Huffmire, and F. C. Reitman. Sep 79, 22p
W80-06002, OWRT-A-082-CONN(1)
Contract DI-14-34-0001-9007

Evidence indicates that many of Connecticut's high yield aquifers are already contaminated and that without immediate action to restrict harmful surface practices, they will be followed by others. Economic evidence indicates that the State as a whole can reap substantial benefits by an intelligently conceived and implemented program of land use monitoring and water resource planning, but that such a program can only be undertaken through additional legislation and funding. Current legal mechanisms for the orderly management of water resources are insufficient and need overhaul.

PB80-202526 PC **A07**/MF **A01**
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
The Impact of Nonstructural Flood Abatement Measures on Patterns of Industrial Location.
Project completion rept.,
Daniel D. Singer, and Jonathan W. Kohn. Jun 80, 131p W80-06011, OWRT-A-052-PA(1)
Contract DI-14-34-0001-9040
Prepared in cooperation with Shippensberg State Coll., PA. Dept. of Economics and Management Science.

This report outlines the hydrologic and economic characteristics of the Susquehanna River Basin, and analyzes flood damages and the effect of nonstructural flood abatement measures. A new method of estimating flood damages is needed, since current methods do not allow for the actual nature of flood risk and are inherently biased against the use of nonstructural relative to structural flood damage abatement measures. Actual patterns of industrial location in the Susquehanna River Basin are examined, and modifications made to the theory of industrial location under the threat

of flood. The report concludes that the location of an industrial facility in a flood plain reflects, under many circumstances, rational behavior on the part of the firm. Proximity to markets and rail transportation provide significant market economies for industry.

PB80-202625 PC **A04**/MF **A01**
Caribbean Research Inst., St. Thomas, VI. Water Resources Research Center.
The Effects of Rainfall Runoff on Two Undeveloped Tropical Bays in St. John, U.S. Virgin Islands.
Technical rept. Oct 77-Sep 79,
Thomas W. Purcell. Jun 80, 56p TR-5, W80-05799, OWRT-A-008-VI(1)
Contract DI-14-34-0001-7100

Two undeveloped bays in St. John, U.S. Virgin Islands were sampled during a one-year period from December 1977 through November 1978. Rainfall and runoff were measured for each of the watersheds and salinity, temperature, nutrient and plankton data were collected for the bay waters. The runoff into the bay was calculated and its effect assessed in the light of the ecological parameters measured.

PB80-202963 PC **A12**/MF **A01**
Geological Survey, St. Paul, MN. Water Resources Div.
Water Resources Data for Minnesota, Water Year 1979. Volume 1. Great Lakes and Souris-Red-Rainy River Basins.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
Apr 80, 275p USGS/WRD/HD-79/033, USGS-WDR-MN-79-1
See also Volume 1 for Water Year 1978, PB80-117518. Prepared in cooperation with Minnesota Dept. of Natural Resources, St. Paul. Div. of Waters., and Minnesota Dept. of Transportation, St. Paul.

Water-resources data for the 1979 water year for Minnesota consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality in wells and springs. This volume contains discharge records for 65 gaging stations; stage-only records for 1 gaging station; stage and contents for 5 lakes and reservoirs; water quality for 19 gaging stations, 1 partial-record station, and 13 lakes; and water levels for 39 observation wells. Also included are 48 crest-stage partial-record stations and 21 low-flow partial-record stations.

PB80-203169 PC **A19**/MF **A01**
Geological Survey, St. Paul, MN. Water Resources Div.
Water Resources Data for Minnesota. Volume 2. Upper Mississippi and Missouri River Basins.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
Apr 80, 445p USGS/WRD/HD-79/034, USGS-WDR-MN-79-2
Prepared in cooperation with Minnesota Dept. of Natural Resources, St. Paul. Div. of Waters., and Minnesota Dept. of Transportation, St. Paul. See also Volume 2 for Water Year 1978, PB80-117526.

Water-resources data for the 1979 water year for Minnesota consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality in wells and springs. This volume contains discharge records for 76 gaging stations; stage and contents for 9 lakes and reservoirs; water quality for 39 gaging stations, 2 partial-record stations, 7 lakes and 10 wells; and water levels for 214 observation wells. Also included are 111 crest-stage partial-record stations and 85 low-flow partial-record stations.

PB80-203219 PC **A09**/MF **A01**
General Electric Co., Santa Barbara, CA. Center for Advanced Studies.
Groundwater Quality Monitoring of Western Oil Shale Development: Monitoring Program Development,
Guenton C. Slawson, Jr. May 80, 200p
GE78TMP-90, EPA-600/7-80-089
Contract EPA-68-03-2449

This report presents the development of a preliminary design of a groundwater quality monitoring program for oil shale operations, such as proposed for Federal Prototype Lease Tracts U-a and U-b in eastern Utah. A preliminary decision framework for monitoring design for this type of oil shale operation is presented. Included under the broad topic of the monitoring plan are recommendations for developing background data bases on pollutant source characteristics, the hydrogeologic framework of the study area, existing water quality, and infiltration, as well as recommendations for monitoring pollutant quality, and infiltration, as well as recommendations for monitoring pollutant mobility.

PB80-203326 PC **A04**/MF **A01**
Nevada Univ. System, Reno. Water Resources Center.
Investigation of Groundwater Quality and Its Effect on Suburban Development in Washoe Valley, Nevada,
A. Thomas Armstrong, and John W. Fordham.
Dec 77, 68p PROJECT-48, W80-06005, OWRT-A-065-NEV(2)
Contract DI-14-34-0001-6029

In reponse to water quality problems in the New Washoe City-Washoe Farms portion of the Washoe Valley, Nevada, an area of more than 200 households, a water quality study was initiated in November 1974. 257 water samples were collected for chemical analysis from domestic wells and streams flowing into the valley. In addition, approximately 260 well analyses were available from other sources. The rates of flow were measured, on a monthly basis, of inflowing streams for a period of one year and are given in the report.

PB80-203615 PC **A08**/MF **A01**
South Carolina State Dept. of Health and Environmental Control, Columbia. Hydrology Div.
Evaluation of the Impact of Landfill Leachate on Ground-Water Quality at the Lexington County, South Carolina Landfill Site,
Joseph O. Lewis, and D. A. Duncan. Apr 80, 156p EPA-904/9-80-050
Contract EPA-68-01-3959

The report describes efforts made to monitor the leachate impact on the groundwater at the Lexington County, South Carolina Landfill. The geology and hydrogeology of the region, as well as the landfill in particular, are discussed in detail to help determine the movement of groundwater near the landfill. The purpose of the report was to isolate the groundwater effects of a nearby abandoned site, Cayce Dump. Fourteen stratigraphic test holes, six monitoring wells, and three existing wells were used for groundwater monitoring.

PB80-204449 PC **A04**/MF **A01**
Oklahoma Univ., Norman. Bureau of Water and Environmental Resources Research.
Demonstration of an Analytical Model for Establishing Water Resources Development Priorities,
G. W. Reid, and T. W. K. Leung. Sep 79, 73p W80-06008, OWRT-A-089-OKLA(1)

A priority system for Oklahoma water resource development projects based on an analytical model is reported. Single Index and Double Index Approaches were used to develop the priority listings which may be very useful for the State decision maker in the funding of proposed water resources projects. Seven arbitrarily selected water projects (five impoundments and two water treatment facilities) with adequate pertinent data were used for this study. Groundwater development projects were not included because they seldom contain enough useful data for decisions to be based on and the environmental assessment of such projects is quite controversial. Some initial computation was necessary to convert the data from the projects into a useful form.

PB80-204456 PC **A21**/MF **A01**
Iowa Univ., Iowa City. Inst. of Hydraulic Research.
A Numerical Model for Computation of Sedimentation in Lakes and Reservoirs. Part I. Description of SEDRES, and Its Application in the Computation of Sediment Deposition in Coralville Reservoir. Part II. Sedimentation in Red Rock Reservoir. Part III. Sedimentation in Saylorville Lake,
Fazle Karim, Thomas E. Croley, II, and John F. Kennedy. 1979, 500p IIHR-226, W80-06012, OWRT-A-068-IA(1)
Contract DI-14-34-0001-8017
Also pub. as Iowa State Water Resources Research Inst., Ames rept. no. ISWRRI-105.

A new computer-based numerical model, SEDRES, is developed for the calculation of amounts, rates, and spatial distributions of sediment in lakes and reservoirs. The principal components of SEDRES compute the following: sediment entrapment, distribution, and differential settling for three different size classes (clay, silt, and sand).

PB80-204696 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Influence of Sieve Mesh Size Selectivity on Benthic Invertebrate Indices of Eutrophication.
Journal article,
William T. Mason, Jr., Philip A. Lewis, and Patrick L. Hudson. Oct 75, 15p EPA-600/J-75-003
Pub. in Verh. International Verein. Limnology, v19 p1550-1561 Oct 75. Prepared in cooperation with Interstate Commission on the Potomac River Basin, Bethesda, MD., and Department of the Interior, Washington, DC.

The selective retention of benthic invertebrates by sieves of various mesh sizes was demonstrated by Jonasson (1955, 1958) who reported that decreasing the mesh opening from 0.62 to 0.51 mm (effective decrease on one-third mesh opening area) resulted in samples with an average of 47% more Tanypus chironomid larvae. Sieve mesh size was also found to be highly selective toward oligochaetes of particular size ranges. Studies supported Jonasson's findings that the head capsule width of chironomid larvae governed their retention.

PB80-205230 PC **A18**/MF **A01**
Geological Survey, Champaign, IL. Water Resources Div.
Water Resources Data for Illinois, Water Year 1979. Volume 2. Illinois River Basin.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
May 80, 414p USGS/WRD/HD-80/037, USGS-WDR-IL-79-2
See also Volume 2 for Water Year 1978, PB-296 417.

Water resources data for the 1979 water year for Illinois consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of ground-water wells. This volume contains records for water discharge at 85 gaging stations; stage only at 2 gaging stations; stage only at 3 lake stations; water quality at 92 gaging stations and 25 wells; and water levels at 3 observation wells. Also included are data for 96 crest-stage partial-record stations and 42 flood-profile stations.

PB80-205875 PC **A23**/MF **A01**
Michigan Univ., Ann Arbor. Coastal Zone Lab.
Urban Riverfront Capability Expansion Analysis.
Jul 79, 550p TR-116, NOAA-80061112
Prepared in cooperation with Michigan Dept. of Natural Resources, Lansing, and Detroit, MI.

The results of an eight month study carried out by the Coastal Zone Laboratory is presented. Three major objectives of the project were: (1) to suggest a series of concepts or techniques to expand or enhance the riverfront resources of the City of Detroit; the descriptions of specific concepts were to be done in close interaction with the Riverfront Task Force of the City of Detroit; specific sites along the riverfront were identified by the Task Force, and riverfront expansion techniques to enhance the use of these sites were then suggested and described; (2) to identify the various legal, environmental, and engineering techniques and to comment on possible approaches to enhance the implementation of such techniques; and (3) to examine the process for implementing riverfront expansion techniques and to comment on possible approaches to enhance the implementation of such techniques.

PB80-206196 PC **A04**/MF **A01**
Hawaii Univ., Honolulu. Water Resources Research Center.

Urbanization-Induced Impacts on Infiltration Capacity and on Rainfall-Runoff Relation in an Hawaiian Urban Area.
Technical rept.,
Edwin T. Murabayashi, and Yu-Si Fok. Sep 79, 58p TR-127, W80-06078, OWRT-A-050-HI(1)
Contracts DI-14-31-0001-5011, DI-14-34-0001-6012
Sponsored in part by Contracts DI-14-34-0001-7025, and DI-14-34-0001-7026.

The effect of urbanization on infiltration and rainfall-runoff relations was investigated at Mililani Town, Oahu, Hawaii, a residential community. The double-ring method determined the mean constant infiltration rate to be 17.58 cm/hr (7.03 in./hr) under pre-urban, long-abandoned, and overgrown pineapple field conditions.

PB80-208564 PC **A05**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Hydrogeologic Description of the Proposed Delmarva Power and Light Company Power Plant Site at Vienna, Maryland.
May 80, 93p PPSP/JHU/PPSE-8-6
Prepared in cooperation with Geraghty and Miller, Inc., Annapolis, MD.

This report provides a description of the hydrogeologic features in and around the proposed power plant and waste disposal site. Undertaken in two phases, between mid-1978 and late 1979, the investigations leading to this report was designed to collect regional data on the fresh ground-water system and site-specific data on the uppermost aquifer (The Pleistocene Aquifer). The report is divided into two major sections along these lines. The regional hydrogeologic description includes data on the climate; surface-water runoff and ground-water recharge; surface-water quality; and hydraulic and water-quality properties of the Pleistocene, Frederica, Federalsburg, and Piney Point Aquifers. The site-specific hydrogeologic description emphasizes conditions in the upper 40 feet of the Pleistocene Aquifer. This section includes a description of the aquifer lithology, groundwater flow patterns, hydraulic properties including hydraulic conductivity, ground-water flow velocities, and water quality.

PB80-208572 PC **A03**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Hydrogeologic Description of a Proposed Power Plant Site at Church Creek, Maryland.
Apr 80, 41p PPSP/JHU/PPSE-8-9
Prepared in cooperation with Geraghty and Miller, Inc., Annapolis, MD.

This report provides a description of the hydrogeologic system around Church Creek, Maryland. A field data-collection program was undertaken between early November and mid-December 1979, to collect site-specific data on the hydrogeologic system at Church Creek, Maryland. Soil borings were made at 8 locations and 13 monitor wells were installed. Resulting from these borings or wells were data on: (1) geology of the upper 50 feet of material beneath the proposed power-plant site, and (2) water levels at various depths, and (3) water quality at various depths.

PB80-209356 PC **A11**/MF **A01**
Environmental Protection Agency, Chicago, IL. Region V.
Atmospheric Loadings to Waters of the Four Upper Great Lakes. A Status Report,
Charles T. Elly. Feb 80, 240p EPA-905/80-002

This report contains a summary of loadings to the lakes for 33 parameters including pH, conductance, solids, sulfates, chlorides, nitrogens, phosphorus, and 23 metals, during the period from August, 1978 to July, 1979. The report also contains an assessment of problems which plague the program and recommendations to follow in order for Region V to obtain useable atmospheric loading data.

8I. Mining Engineering

BMFT-FB-T-79-05 PC **A05**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Inst. fuer Eisenhuettenkunde.
Pressure-Change Underground Gasification: Theoretical and Experimental Investigations of Gasification.
C. P. Beckervordersandforth, J. Belzer, M. Kuehn, M. Mohtadi, and W. Sitte. Jun 79, 93p
In German.
U.S. Sales Only.

A program is described for the extraction of SNG, reducing gas or other gaseous fuels by means of in-situ coal gasification with hydrogen, air and oxygen mixtures, particularly in deeper deposits, with special regard to the pressure change process. Simulation experiments above ground and a feasibility-study will be carried out. (ERA citation 05:002382)

GJBX-101(80) MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Phenix City National Topographic Map, Alabama/Georgia, Southeast US Project 1979.
1979, 266p
Contract AC13-76GJ01664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Phenix City National Topographic Map NI16-12 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:023691)

GJBX-104(80) MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Adel National Topographic Map, Oregon. Rocky Mountain, 1979.
1979, 292p
Contract AC13-76GJ01664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Adel National Topographic Map NK11-4 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:023692)

GJBX-95(80) MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Jordan Valley National Topographic Map, Idaho and Oregon. Rocky Mountain, 1979.
1979, 394p
Contract AC13-76GJ01664
Microfiche copies only.

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Jordan Valley National Topographic Map NK11-5 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:023685)

GJBX-96(80)(V.1) MF **A01**
EG and G GeoMetrics, Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Idaho Project, Nemo Detail Area, South Dakota. Final Report.
Apr 80, 66p
Contract AC13-76GJ01664
Microfiche copies only.

During the month of August, 1979, EG and G GeoMetrics collected 148 miles of high sensitivity airborne radiometric and magnetic data in western South Dakota. Data were collected on tranverse lines 1/4 mile apart and on two tie lines approximately 2 miles apart in one detail area within the Rapid City 1 exp 0 x 2 exp 0 sheet. All data were fully reduced and interpretated by geoMetrics and presented in two volumes. A relative dearth of geologic information seems to exist in this area. Paleozoic and Precambrian sedimentary, metamorphic, and igneous rocks appear to cover most of the region of study. Paleozoic rocks are primarily confined to the eastern side. A wide variety of Precambrian rocks are present as mapped. In addition to the standard data presentations and processing procedures, the data were examined for anomalous uranium valves and mappable geochemical subunits using the radiometric and magnetic data. Principal component analysis was performed on the radiometric data using standard deviation subunits defined by BFEC. (ERA citation 05:023686)

GJBX-96(80)(V.2) MF **A01**
EG and G GeoMetrics, Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Idaho Project, Nemo Detail Area, South Dakota. Final Report.
Apr 80, 106p
Contract AC13-76GJ01664
Microfiche copies only.

The Nemo Detail area covers 40 square miles in the eastern portion of the Black Hills Uplift. The region's geology is a combination of Precambrian igneous and metamorphic rocks, and overlying Early Paleozoic sediments and metasediments. The Paleozoics cover most of the eastern half of the area. A total of 7 groups of samples in uranium window constitute anomalies as defined in Volume I. These anomalies occur in locales of relatively high uranium and thorium with respect to the balance of the detail area. Magnetic data show a wide range of gradients; but fail to show a significant degree of correlation with available geologic interpretations or the radiometric data. Only one geochemical unit was defined on the basis of the radiometric criteria set forth in Volume I. (ERA citation 05:023687)

INIS-mf-4537 PC **A05**/MF **A01**
Instituto Politecnico Nacional, Mexico City. Escuela Superior de Ingenieria y Arquitectura.
Geology and Exporation Work for Uranium in the Buenavista Area, State of Nuevo Leon, Mexico.
M. A. Partida A. 1977, 81p
In Spanish.Thesis.
U.S. Sales Only.

The area was studied and explored in an indirect way: geochemistry and geophysics, through radiometric and emanometric detection, together with

analysis of the geological factors made possible the geological interpretation of the area. The studied deposit is of the supergenic type and is situated in a sandy body which has a thickness of 8 to 13 meters and belongs to the Frio no Marino Formation. An intensification of the explorations is recommended in all the other parts of the Burgo Basin, mainly in the Oligocenic zone, and it is suggested to make more objective the radiometric aerial surveys. We conclude that we have to take into consideration the economical importance of the Buenavista deposit since it represents a potencial richness of approximately, 2,000 million pesos, on the basis of the present cost of the uranium ore. (Atomindex citation 10:426075)

INIS-mf-4688 PC **A05**/MF **A01**
Water Planning for Israel Ltd., Tel Aviv.
Possible Uses of Geochemical and Isotopical Investigations of Ground Waters in Oil and Gas Prospecting.
A. Mercado, Y. Kahanovitz, A. Nissenbaum, and A. Kaufman. Jul 78, 100p
In Hebrew.
U.S. Sales Only.

This work describes the use of geochemical investigation of ground waters for finding deep organic accumulations. It is based on the identification of abnormal values of chemical and isotopical parameters: bicarbonates, CO sub 2 , sulfates, carbon 13 and carbon 14. Further improvements will make this method a useful tool in oil and gas prospecting and detection as well as in the detection of geochemical anomalies. The advantages of the method are its low cost and relative rapidity; the disadvantage is that it can be carried out only when water sources are present in the exploration field. (Atomindex citation 10:444856)

INIS-mf-5414 PC **A02**/MF **A01**
Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro. Dept. de Exploracao Mineral.
Uranium Prospecting in the Iguatu and Frade Basins (Brazil).
J. C. Lemos. 1973, 9p CONF-7310134-1
In Portuguese.27. Brazilian congress of geology, Aracaju, Brazil, Oct 1973.
U.S. Sales Only.

The Mineral Exploration Department of CNEN studied the possibilities of uranium occurences in the Iguatu and Frade Basins in the preliminary research program designated 'Small Basins of the Northeast' which contitutes the object of this report. The two basins are located in the State of Ceara. The results of geologic and radiometric researches ahowed that the possibilities for uranium mineralizations were small, since the analyses of samples from the two main anomalies showed the radioactivity came from the remains of monazite. Further analysis of sedimentologic factors indicated favorable confitions for uranium concentration, taking into consideration the large variations of vertical and lateral granulometries, which permit spectulation about the flow of uraniferous solutions. radiometric measurements of surface samples were insignificant and no uranium mineral was found. The result of research of the sedimentary Frade Basin was negative for uranium mineralization. The basin was entirely eroded, remaining as an outcrop described in this report. (Atomindex citation 11:502229)

INIS-mf-5443 MF **A01**
Erlangen-Nuernberg Univ. (Germany, F.R.). Inst. fuer Geologie und Mineralogie.
Photogeological Linear Analysis and Its Application in Uranium Prospection in Upper Palatinate.
M. Fuerst, R. Krupp, and R. Mueller. Aug 78, 26p
In German.
U.S. Sales Only. Microfiche copies only.

The airphoto linear (fracture trace) analysis, comprises gray tone (gray tone interchange)-, vegetation (vegetation interchange)-, aquatic (incl. valley margin)- and morphologic linears; the latter can be subdivided into morphologic positive and negative lineations and those which reflect minor block edges. The relation between airphoto lineations and fractures in the field is established. A FORTRAN computer program for statistical analysis of airphoto-lineations and fracture data is provided, which is able to compute rose-diagrams and to plot these graphically. (Atomindex citation 11:504963)

INT-110/I PC **A02**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Some Problems of Borehole Neutron-gamma Spectrometry.
E. Chrusciel. 1977, 19p
In Polish.
U.S. Sales Only.

The paper presents some results of the measurements performed in geophysical models for the determination: optimum source-to-detector distance, optimal size and material of gamma-ray detector shielding, detection efficiency in the energy range of 0.1 MeV - 10 MeV. The solution of these problems enables the quantitative interpretation of the neutron induced gamma-ray spectra. (Atomindex citation 10:420746)

INT-119/I PC **A02**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Radioisotope X-Ray Fluorescence Method of the Determination of Copper Ore Grain Size in Mineral Slurry.
M. Lankosz, and B. Holynska. 1977, 16p
In Polish.
U.S. Sales Only.

Radioisotope X-ray fluorescence method of determination of grain size below 75 mu m in mineral slurries of copper ores has been woeked out. Two radioisotope sources of different energies of X-rays (exp 238 Pu and exp 241 Am) have been used for the excitation of copper in slurry. The influence of variable copper and solids contents of slurry and variation of parameters of grain size distribution on measurement results have been studied. The estimated accuracy (absolute 1 st.dev.) of determination of grain size below 75 mu m amounts 4%. (Atomindex citation 10:421197)

INT-125/I PC **A03**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Matrix Effects in the X-Ray Fluorescence Analysis of Zinc-Lead Ores.
M. Kirchmayer. 1977, 40p
In Polish.
U.S. Sales Only.

In the present paper several mathematical procedures for overcoming matrix effects in the X-ray fluorescence analysis of zinc-lead ores varying widely in composition are examined. Some new intensity correction equations are derived using the theory of X-ray fluorescence. Experiments were carried out on a high resolution Si/Li/ spectrometer and also on portable single-channel analyzer with proportional counter, using exp 238 Pu and exp 55 Fe radioisotope sources. For separation of overlapping spectral lines recorded with a proportional counter, the single edge filter method and pre-calibration is proposed. Multiple regression is applied for the calculation of influence coefficients and estimation of errors of determinations. The present results show that the equations derived in this paper allow zinc, lead and iron in ores to be determined with relatively high accuracy. (Atomindex citation 10:421195)

LA-UR-80-1013 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Los Alamos Scientific Laboratory Approach to Hydrogeochemical and Stream Sediment Reconnaissance for Uranium in the United States.
S. L. Bolivar. 1980, 23p CONF-800465-2
Contract W-7405-ENG-36
International geochemical exploration symposium, Hanover, F.R. Germany, 10 Apr 1980.

The Los Alamos Scientific Laboratory of the United States is conducting a geochemical survey for uranium in the Rocky Mountain states of New Mexico, Colorado, Wyoming, and Montana and in Alaska. This survey is part of a national hydrogeochemical and stream sediment reconnaissance in which four Department of Energy laboratories will study the uranium resources of the United States to provide data for the National Uranium Resource Evaluation program. The reconnaissance will identify areas having higher than background concentrations of uranium in ground waters, surface waters, and water-transported sediments. The reconnaissance data will be combined with data from airborne radiometric surveys and geological and geophysical investigations to provide an improved estimate for the economics and availability of nuclear fuel resources in the United States and to make information available to industry for use in the exploration and development of uranium resources. Water samples are analyzed for uranium by fluorometry which has a 0.02 parts per billion lower limit of detection. Concentrations of 12 additional elements in water are determined by plasma-source emission spectrography. All sediments are analyzed for uranium by delayed-neutron counting and a 20 parts per billion lower limit of detection. Elemental concentrations in sediments are also determined by neutron activation analysis, x-ray fluorescence, and by arc-source emission spectrography. To date, all of four Rocky Mountain states and about 80% of Alaska have been sampled. About 220,000 samples have been collected from an area of nearly 2,500,000 km exp 2 . The philosophy, sampling methodology, analytical techniques, and progress of the reconnaissance are described in several published pilot study, reconnaissance, and technical reports. The Los Alamos program was designed to maximize the identification of uranium in terrains of varied geography, geology, and climate. (ERA citation 05:023697)

METC/CR-80/2 PC **A06**/MF **A01**
Science Applications, Inc., Morgantown, WV.
Eastern Gas Shales Project Outgassing Analysis. Special Report.
D. L. Streib. Feb 80, 108p
Contract EW-78-C-21-8216

Two methods are used on the Eastern Gas Shales Project to measure the gas volume of encapsulated shale samples. The direct method measures pressure and volume and is initiated almost immediately upon encapsulation of the sample. A second method measures pressure, volume, and composition, and is initiated after pressure is allowed to build up over several weeks. A combination of the two methods has been used on selected samples, and yields more data as it allows extrapolation to account for gas lost prior to encapsulation. The stratigraphic horizons, characterized by dark shales with high organic and high carbon content and a relatively high gamma ray intensity of 200+ API units also have high gas contents (relative to other units within the same well). The Lower Huron, Rhinestreet, and Marcellus Shales are high in gas content relative to other stratigraphic units at the same sites. The difference in gas content of the same stratigraphic horizon between well sites appears to be controlled by the thermal maturity. Kinetic studies have shown that, in some samples, significant amounts of gas are released after the time when the gas volume would be initially measured. Additional work needs to be performed to determine why the rates and volume of gas released vary between samples. (ERA citation 05:018397)

NP-23684 PC **A04**/MF **A01**
Appalachian State Univ., Boone, NC. Dept. of Geology.
Geochemical Exploration Program for Uranium in the Northern Wadesboro and Southern Sanford Triassic Basins of North Carolina.
J. E. Callahan. 1 Apr 78, 71p

The purpose of the grant was to locate favorable areas for follow-up uranium exploration in the two basins; this was accomplished by analyzing 235 stream sediment samples. Eighteen of the 235 samples contained at least 1 ppM uranium and were considered to be possibly anomalous. Six of the high-U samples had significant thorium values (100 ppM), and therefore their high U values are probably from thorium-rich minerals such as monazite. Follow-up work should be done on the 13 samples with low thorium values. (ERA citation 04:032470)

NP-23703 PC **A02**/MF **A01**
Minnesota Univ., St. Paul. Dept. of Agricultural and Applied Economics.
Taxation of Lignite Mining in Montana and North Dakota.
S. W. Voelker, and T. F. Stinson. Mar 79, 14p

This paper compares taxes on lignite mining in North Dakota and Montana, using the ENERGY-TAX simulation model. While severance tax pay-

ments are similar - $0.88 per ton in North Dakota compared to $0.94 to $1.07 in Montana - the total tax bill is much less in North Dakota. A model 2 million ton lignite mine, producing fuel for a mine-mouth thermogenerator, would pay State and local taxes of $1.44 per ton in Montana, but only $0.96 in North Dakota. Much of the additional tax in Montana results from including gross proceeds of the mine in the local property tax base. (ERA citation 04:042274)

NP-23825 PC A04/MF A01
Kingston, Reynolds, Thom and Allardice Ltd., Auckland (New Zealand).
First Stage Report on Geothermal Exploration in Leyte, Philippines.
63p
U.S. Sales Only.

An exploratory drilling program for geothermal energy at the Tongonan geothermal area in Leyte, Republic of Philippines was accepted by the New Zealand and Philippine Governments as a technical co-operation project in 1973. Seven test wells were drilled to a maximum depth of 2000 ft. Two wells (TGE-5 and TGE-5A) encountered the hot, high chloride water which is discharging at th Banat-i springs in the Bao Valley. TGE-5A discharged low enthalpy steam and hot water, but rapid clogging of the well by aragonite prevents the use of the steam for the production of electrical power. TGE-3, TGE-7 and TGE-6 water samples contained 10 to 50%, 5% and a trace, respectively of the high chloride waters, probably from the same source as the waters encountered in TGE-5 and TGE-5A. TGE-1 and TGE-2 contained steam heated meteoric waters only. Drilling and geochemical results would indicate the heat source and hot water aquifer lie to the north or east of wells TGE-5 and TGE-5A with these wells being on the periphery of the hydrothermal system. (ERA citation 04:053072)

NP-23923 PC A09/MF A01
California Energy Commission, Sacramento.
Feasibility and Economics of Cogeneration in California's Thermal Enhanced Oil Recovery Operations.
M. Henwood. Dec 78, 199p

This study was performed to: determine feasible oil field locations for cogeneration, if any; examine the options for using oil or coal as the fuel source; determine the aggregate generation capacity at the feasible sites. There are four feasible oil field cogeneration sites in California. However, because of the high injection pressures, coal is not an economic cogeneration fuel and gas turbine-based systems must be used. Coal use may make economic sense for steam generation alone in the 1980's if coal and oil prices diverge as expected and the operators receive uncontrolled prices for the oil use displaced by coal. The aggregate capacity for gas turbine-based systems is between 900 to 1550 MW and can be realized by 1990. The differences between the two gas turbine systems are summarized. (ERA citation 05:000120)

NP-24010 PC A06/MF A01
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen.
Degassing of Bituminous Coal in the Fly Dust Reactor.
L. Huber. 21 Jan 78, 114p
In German.Thesis.
U.S. Sales Only.

Bituminous coal was degassed in an electrically heated fly dust reactor with a contact time of 3 seconds. A preoxidized gas coal was used as starting coal. The reaction temperature and carrier medium (N sub 2 , H sub 2) were varied as parameters. The degassing products were gas, crude benzene, tar, water of formation, coke, as well as a soot/pitch fraction. Analytical methods were worked out to characterize the degassed products. A method was developed to determine the gaseous sulfur compound which may also be applied to the gasification of coal and coke. (ERA citation 05:006407)

NP-24013 PC A06/MF A01
Technische Univ., Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Natur- und Geisteswissenschaften.
Investigations of the Geological Value of Borehole Logs in Hard Coal Mining.
Z. El-Masri. 16 Dec 77, 173p
In German.
U.S. Sales Only.

The paper investigates the use of geophysical borehole logs in hard coal mining and their qualitative and quantitative evaluation. To begin with, common methods and some more recent methods are explained, and correlations between petrographic characteristics of the hard coal rock and the physical variables required for a qualitative and quantitative interpretation are discussed. There was also the problem to what extent the theoretical fundamentals of borehole logging and the experience gained in other fields of exploration (mainly oil and gas exploration) can be applied to the investigation of hard coal deposits. With the evaluation of the present in-situ borehole data, the following seam parameters are determined and assessed; seam detection and seam thickness, seam structure, ash content, carbonization, strength characteristics. In determining these parameters, the best results were obtained by combining the following techniques: density log, acoustic log, gamma log, caliber log. Resistance measurement with spacing in the inch range. Combined evaluation of these four techniques often gives a better picture than a geological analysis of drilling cores, especially in case of core losses. (ERA citation 05:006439)

NP-24042 PC A05/MF A01
National Coal Board, London (England).
National Coal Board: Report and Accounts, March 26, 1978-March 31, 1979.
1979, 94p
U.S. Sales Only.

The importance of coal, which became evident once again after the massive oil price increases of 1973/4, has been further underlined by the disturbance in the oil market occasioned by the troubles in Iran. In spite of North Sea oil, Britain has not escaped the repercussions of this situation. The case for a long term policy for developing Britain's energy resources seems now generally accepted. The coal industry's plan for expansion was agreed in 1974 and has been applied consistently ever since. It is based on more exploration, investmant, and research. The capital cost of this expansion plan is substantial and is creating serious short-term financing problems for the industry. But it is a vital element in Britain's energy insurance and there can be no doubt of the need to persevere with it. The industry's success depends not only on increasing levels of carefully directed investment but also on getting results as soon as possible from that investment. In 1978/9 these results, in the form of improving productivity, began to emerge. Productivity at the face rose by 8% and overall by more than 2%. In development drivages (that is, in the work needed to create new faces) the improvement was 5%. (ERA citation 05:002478)

NP-24043 PC A02/MF A01
National Coal Board, London (England).
National Coal Board Statistical Tables 1978/9.
1979, 14p
U.S. Sales Only.

No abstract available.

NP-24068 PC A09/MF A01
Technische Hochschule, Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen.
Pollen Analyses in the Rhenish Main Brown Coal SEAM of the Frechen and Fortuna Open Cast Mines with Special Regard to Coal Macropetrography.
W. Hiltmann. 26 Nov 76, 181p
In German.
U.S. Sales Only.

Pollen analyses were carried out in two seam profiles of te Frechen open-cast mine and two seam sections of the Fortuna open cast mine of Rhenish brown coal in continuous series of samples. The analyses were based on macropetrographic pictures of the seam. The dissertation attempts a palynological characterization of lithotypes, i.e., coal elements that can be distinguished by macropetrography and thus an interpretation of these elements in the sense of botanical-ecological facies types of the brown coal moor. (ERA citation 05:002425)

NP-24109 PC A07/MF A01
Technische Univ. Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen.
Investigations for an Optimum Yield of Petroleum Deposits.
G. Boor. 16 May 77, 147p
In German.Thesis.
U.S. Sales Only.

The paper attempts an investigation of effects and interactions of physical, technical, and economic factors with regard to an optimization of petroleum yields. For this purpose, an optimization calculation is carried out for the yield of a model petroleum deposit with the aid of the simulation method. (ERA citation 05:004011)

NP-24146 PC A07/MF A01
Steinkohlenbergbauverein, Essen (Germany, F.R.).
Steinkohlenbergbauverein Annual Report 1977.
1977, 143p
In German.
U.S. Sales Only.

Three chapters from the German coal industry 1977 annual report have been entered individually into EDB. (ERA citation 05:002374)

NP-24161 PC A08/MF A01
Kiel Univ. (Germany, F.R.). Fachbereich Mathematik-Naturwissenschaften.
Geophysical Examination of Lake Kivu and its Unusual Methane Deposit.
K. Tietze. 21 Jun 78, 161p
In German.Thesis.
U.S. Sales Only.

Lake Kivu lies in the western branch of the East African rift valley. In its depths it contains a methane deposit. Apart from methane, other gases are also dissolved in the lake water. Various physical parameters of the lake water were systematically measured at 41 in situ vertical profiles distributed over the whole lake and with 185 water or gas samples. The most important parameter for water stratification is the in situ density. Apart from this, the distribution of in situ conductivity and temperature, and the tritium, deuterium, and oxygen 18 concentrations and the quantities of the various dissolved gases were determined. The connection of the various dissolved gases were determined. The connection between water density, temperature, conductivity, and the dissolved quantities of gas were described by an empirical equation. This enables one to calculate the effect of individual parameters on the density. The density stratification of lake water is the cause and basis of the gas deposits. Without the stratification, they would not have been formed, as the methane formed in sediment could not have accumulated in the deep water in that case. As the deposit contains about 63 million m exp 3 (by volume) of methane, it is of great importance for the economic development of the Lake Kivu region. The data given here therefore have some economic importance, apart from the scientific interest. They are the basis for mathematical-numerical models for opening up this unusual deposit. The model calculations lead to a plan for exploitation. The equipment developed here should be used for monitoring and controlling extraction. (ERA citation 05:006469)

NP-24424 PC A02/MF A01
Economic Aspects of the Solids-Water Transportation of Coal.
R. Koehling, and D. Leininger. 1976, 14p
A, Aufbereit.-Tech. n11 P574-579 1976.
U.S. Sales Only.

The following conclusions can be derived from the considerations outlined above: efforts must be made to reduce as far as possible the cost of the starting and terminating stations. One way of doing this would be to set a higher upper limit on the grain size of the transported slurry and thereby design the installations for primary and secondary treatment more cheaply. The cost of dewatering

must be brought down by applying the findings of the research project, Optimization of Dewatering, carried out by the Steinkohlenbergbauverein, Essen and subsidized by the Land of North-Rhine Westfalia. Efforts must continually be made to re-utilize the transport water, e.g., for cooling or quenching purposes. When looking at the profitability of hydraulic coal transport, all the factors affecting cost and revenue must be taken into account. As the upper size limit is raised, knowledge of the interrelationships involved in producing a stable suspension must be extended and used for reducing costs. The multiplicity of factors and their interaction does not allow of any definitive, university valid conclusion on the profitability of hydraulic solids transport. For each possible application, the technical-economic optimum must be established with the aid of a mathematical model. The particular advantages which hydraulic pipeline transport offers for many applications guarantee a secure place for this transport technique. (ERA citation 05:020018)

NUREG/CR-1549 PC **A03**/MF **A01**
Kilborn/NUS, Inc., Denver, CO.
Estimates of Uranium Content and Radon Flux for Uranium Mine Dumps Based on Borehole Radioactivity Logs.
Topical rept.,
Donald W. Riedel. Jul 80, 37p
Contract NRC-02-78-044

In exploratory drilling to locate uranium deposits, borehole logs of gamma radiation from naturally radioactive elements are used to indicate the presence of uranium and the concentrations in which it is found at various depths. This report describes a method of using borehole log data to estimate uranium concentrations in the rock surrounding or overlying uranium deposits and to predict radon releases from waste rock brought to the ground surface in mining operations. The method can be used to predict radon releases before mining operations are started so that potential environmental impacts can be evaluated.

PAT-APPL-6-021 141 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Method of Determining Interwell Oil Field Fluid Saturation Distribution.
Patent Application,
E. C. Donaldson, and F. D. Sutterfield. Filed 16 Mar 79, 27p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of determining the oil and brine saturation distribution in an oil field by taking electrical current and potential measurements among a plurality of open-hole wells geometrically distributed throughout the oil field is described. Poisson's equation is utilized to develop fluid saturation distributions from the electrical current and potential measurement. Both signal generating equipment and chemical means are used to develop current flow among the several open-hole wells. (ERA citation 05:028384)

PAT-APPL-6-034 804 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Improved Method for Enhanced Oil Recovery.
Patent Application,
J. R. Comberiati, C. D. Locke, and K. I. Kamath. Filed 30 Apr 79, 11p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention is directed to an improved method for enhanced recovery of oil from relatively cold reservoirs by carbon dioxide flooding. In oil reservoirs at a temperature less than the critical temperature of 87.7 exp 0 F and at a pore pressure greater than the saturation pressure of carbon dioxide at the temperature of the reservoir, the carbon dioxide remains in the liquid state which does not satisfactorily mix with the oil. However, applicants have found that carbon dioxide can be vaporized in situ in the reservoir by selectively reducing the pore pressure in the reservoir to a value less than the particular saturated vapor pressure so as to greatly enhance the mixing of the carbon dioxide with the oil. (ERA citation 05:028383)

PATENT-4 159 757 Not available NTIS
Department of Energy, Washington, DC.
Bulk Material Handling System.
Patent,
W. K. Kleysteuber, and W. D. Mayercheck. Filed 4 May 77, patented 3 Jul 79, 8p PAT-APPL-793 664
Supersedes PAT-APPL-793 664-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This disclosure relates to a bulk material handling system particularly adapted for underground mining and includes a monorail supported overhead which carries a plurality of conveyors each having input and output end portions with the output end portion of a first of the conveyors positioned above the input end portion of a second of the conveyors, a device for imparting motion to the conveyors to move the material from the input end portions toward the output end portions thereof, a device for supporting at least one of the input and output end portions of the first and second conveyors from the monorail, and the supporting device including a plurality of trolleys rollingly supported by the monorail whereby the conveyors can be readily moved therealong. 15 claims. (ERA citation 05:029463)

PB80-204480 PC **A13**/MF **A01**
NUS Corp., Rockville, MD. Energy Systems Div.
Hazardous Surface Openings to Abandoned Underground Mines, Black Hills National Forest. Volume II: Appendix C. Abandoned Mine Identification Area A.
Open file rept. (Final) 29 May 79-1 Sep 79,
L. A. Stinnett, M. R. Lawton, and W. F. Jennings. 28 Sep 79, 289p BUMINES-OFR-74(2)-80
Contract J0295011
See also Volume 3, PB80-204498.
Also availabe in set of 3 reports PC A13, PB80-204464.

This study was conducted to: (1) examine a representative sample of surface openings to abandoned and inactive underground mines in the Black Hills; (2) to identify those openings of the sample that are a public hazard; (3) to design low cost protection to eliminate the hazard; and (4) to analyze laws and regulations pertaining to associated hazard elimination and jurisdictional and enforcement problems. Volume II contains Appendix C, 'Abandoned Mine Identification Area A', and lists the mines in the northern part of Lawrence and Meade Counties.

PB80-204498 PC **A17**/MF **A01**
NUS Corp., Rockville, MD. Energy Systems Div.
Hazardous Surface Openings to Abandoned Underground Mines, Black Hills National Forest. Volume III. Appendix C. Abandoned Mine Identification Areas B, C, and D.
Open file rept. (Final) 29 May 79-1 Sep 79,
L. A. Stinnett, M. R. Lawton, and W. F. Jennings. 28 Sep 79, 389p BUMINES-74(3)-80
Contract J0295011
See also Volume 1, PB80-204472.
Also available in set of 3 reports PC A17, PB80-204464.

This study was conducted to: (1) examine a representative sample of surface openings to abandoned and inactive underground mines in the Black Hills; (2) to identify those openings of the sample that are a public hazard; (3) to design low cost protection to eliminate the hazard; and (4) to analyze laws and regulations pertaining to associated hazard elimination and jurisdictional and enforcement problems. Volume III contains Appendix C; 'Abandoned Mine Identification Areas CB, C, and D'. This volume lists the mines in the southern part of Lawrence and Meade Counties, and all of Pennington, Custer, and Fall River Counties.

PB80-205446 PC **A07**/MF **A01**
GeoChem Labs., Inc., Houston, TX.
Hydrocarbon Source Facies Analysis, Department of Energy and General Crude Oil Company, Pleasant Bayou No. 1 and 2 Wells, Brazoria County, Texas. Geochemical Service Report.
Final rept. Jun 78-79,
D. G. Bebout, and S. W. Brown. Aug 79, 140p
GRI-78/0023
Contract GRI-5011-321-0125

Organic geochemical analyses were performed for 242 well-cutting samples from the Nos. 1 and 2 wells drilled in Brazoria County, Texas to test geopressured geothermal resources in the Frio Formation. Nearly the entire section is immature, and the potential for indigenously generated hydrocarbons is low.

PEL-260 PC **A03**/MF **A01**
Atomic Energy Board, Pelindaba, Pretoria (South Africa).
Results of a Paleomagnetic Survey Undertaken in the Damara Mobile Belt, South West Africa, with Special Reference to the Magnetisation of the Uraniferous Pegmatitic Granites.
B. Corner, and D. I. Henthorn. Oct 78, 28p
U.S. Sales Only.

A project study, undertaken by the Geology Division of the AEB, on the correlation between airborne magnetic and radiometric data covering a portion of the Damara Mobile Belt in South West Africa, has revealed that all the known occurrences of uranium in late- to post-tectonic leucogranite (alaskite) of the Damara orogeny are associated with negative geomagnetic anomalies. Although the uranium occurrences themselves do not display marked geomagnetic anomalies, their immediate geological environment is characterised by the negative anomalies, which are semi-regional in extent. To investigate the origin of these anomalies, the Atomic Energy Board and the Geological Survey of South Africa undertook a palaeomagnetic study of the area. Oriented cores were taken from 31 sites in the mobile belt, 18 of which were selected within the negative magnetic zones, mostly in close association with known uraniferous alaskitic granites. Palaeomagnetic evidence suggests that the negative geomagnetic anomalies are associated with a remanent magnetisation, resulting from the Damara orogenic event, whose direction is removed from the earth's present field and which has affected rocks of the Nosib Group. Absence of this stable remanent direction in rocks stratigraphically overlying the Nosib Group accounts for the distinctive geomagnetic signature, in the form of negative anomalies, of the Nosib Group. It is this signature which can be used in airborne surveys to identify rocks of the Nosib Group outcropping, or of shallow subcrop, in anticlinal or dome-like structures. Since the uraniferous alaskites are mostly confined stratigraphically to the Nosib Group, the negative geomagnetic anomalies form an important prospecting criterion as they may be used to delineate target areas for further exploration in areas covered by sand, scree and duricrust deposits. (Atomindex citation 10:429919)

PNL-TR-359 PC **A02**/MF **A01**
Two-Stage Heading Machine for Fully Mechanized Driving of a Lateral of 5.3 Meters Diameter.
U. Otto. 1971, 11p
Contract EY-76-C-06-1830
A , Glueckauf, 107 n21 P809-811 1971.

Plans exist to drive a lateral of 1.6 km length and 5.3 m diameter as a ventilation road in the 1100-m horizon of the Consolidation Colliery in Gelsenkirchen (owned by Bergbau AG, Essen). The machine to be used is a heading machine manufactured by Maschinen- und Bohrgeraete-Fabrik Alfred Wirth and Co. KG, Erkelenz. Responsibility for driving the roadway has been assumed by a study group consisting of Gesteins- und Tiefbau GmbH, Essen Gebhardt and Koenig-Deutsche Schachtbau GmbH, Essen, and Murer AG, Erstfeld (Switzerland). The Wirth heading machine is 45 m long and weighs 200 tons. It is being used for the first time for bituminous coal mining in Germany. It consists of the TB II - 300 H full-face and pilot boring machine and of the TBE-II - 300/600 expander boring machine. (ERA citation 05:004005)

PNL-TR-363 PC **A03**/MF **A01**
Prospects for Full-Face Heading Machines in Bituminous Coal Mining in Germany.
E. U. Reuther, and K. Haege. 1973, 28p
Contract EY-76-C-02-0016
A , Glueckauf, 109 n18 P901-907 1973.

Full-face heading machines are being used for driving horizontal stone drifts in bituminous coal

mining in Germany. Since such driving operations generally do not reach lengths necessary to fully depreciate the machine, the future operation of full-face heading machines depends on the whole on the nature and scope of development work being done in bituminous coal mining. A survey has been carried out of the driving operations along horizontal stone drifts longer than 1 km planned for the next two decades, and the possibility of fully mechanized driving has been examined. Since the roadways surveyed concerned only development work to keep up production capacity, we can assume that the scope of driving operations will be maintained, provided there is no significant decline in production capacity in bituminous coal mining in West Germany. It was found that the cross sections of the planned roadways can be grouped according to diameter, and that a few machine sizes, characterized by different borehole diameters, can be derived from those groups. The projects covered by the survey are ordered such that, for the machines of the same diameter, a sequence of driving operations is established to approximate their expected useful life as closely as possible. Three machines would suffice for the estimated 45 to 65 km required roadways longer than 3 km. However, the suitability of the boring technique for a particular project is a question of the attendant costs and thus of its competitiveness with respect to the conventional blasting technique. This question can be decided only from case to case. (ERA citation 05:004004)

PNL-2583(No.6) PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Environmental, Safety and Health Standards Identification for Geothermal Energy. Report 6: Heat Stress.
D. G. Quilici, R. G. Anderson, and J. B. Martin.
Mar 79, 36p
Contract EY-76-C-06-1830

The following are discussed: the physiological effects of heat stress, monitoring equipment, review of existing standards, and evaluation of existing standards. (ERA citation 04:029809)

RLO-1830-T3 PC **A04**/MF **A01**
Owens-Illinois, Inc., Toledo, OH. Corporate Technology Div.
Detailed Conceptual Design of a High Temperature Glass pH Electrode for Geothermal Applications. Final Report, Task I.
D. N. Gray, and P. J. Breno. May 79, 57p
Contract EY-76-C-06-1830

A modification of the planar electrode technology yielded prototype glass pH electrodes that can withstand the minimum test conditions of 250 exp 0 C and 5000 psi in an aqueous synthetic geothermal brine. Electrodes of this design can be made in volume at reasonable cost. In addition, an electrode holder has been designed and prototypes fabricated to permit laboratory testing in simulated geothermal brines of downhole conditions. (ERA citation 05:008398)

SAN-1277-3 PC **A03**/MF **A01**
Santa Fe Energy Co., Santa Fe Springs, CA. Chansior Div.
200 Sand Steamflood Demonstration Project. Third Annual Report, June 1978-June 1979.
Nov 79, 50p
Contract EY-76-C-03-1277

The project is testing an enhanced steamflooding technique in the Midway-Sunset Field, Kern County, California. The 200 Sand Pool made very little primary production and responded poorly to cyclic steam stimulation, so this project was initiated to demonstrate the operational, recovery, and economic aspects of steamflooding a typical heavy oil reservoir which had unfavorable response to cyclic steam stimulation. The test is being conducted in four (4) 2.35 acre inverted seven-spot steam drive patterns, which are not fully developed with producers. The reservoir contains approximately 50 million barrels of oil-in-place in an anticlinal structural feature between 400 and 700 feet in depth. 1.73 million bbl steam (350 exp 0 F, 72% quality) have been injected since October 1975 into the four wells. Production has averaged 136 bbl/d oil and 276 bbl/d water. (ERA citation 05:008066)

SAN-1331-T3 PC **A02**/MF **A01**
California State Lands Div., Long Beach.
Summary of Air Repressurization for Enhanced Oil Recovery. Consultant Report.
W. A. Adent. Oct 78, 15p
Contract EY-76-C-03-1331

The air injection process (also known as the Smith-Dunn or Marietta Process) is a proven technique for the enhanced recovery of oil. The process has been used successfully in Ohio, West Virginia, Pennsylvania, Kentucky, Illinois, Kansas, Oklahoma and Texas. The process is usually associated with leases of low oil production and nearly exhausted reservoir pressure. The process has been used in California in three wells for a few months duration with inconclusive results. When using this process, an explosion hazard is present when certain proportions of air-methane gas are reached. Although a literature search and recent correspondence has not revealed any explosion in air injection repressurization projects caused by spontaneous combustion of the air-natural gas mixture, it is believed such explosions are possible and did occur with ignition by electrostatic or chemical conditions. (ERA citation 05:004012)

SAN-2040-1 PC **A05**/MF **A01**
Lewin and Associates, Inc., Washington, DC.
Improved Steam Flooding by Use of Additives. Final Report.
V. A. Kuuskraa, E. C. Hammershaimb, and T. M. Doscher. Dec 79, 96p
Contract ET-78-C-03-2040

The current level of interest in, need for, and development work in progress on additives for increasing the recovery of steam drive enhanced recovery are discussed. The report consists of the following chapters: summary and conclusions; the status of steam drive operations; the steam drive mechanism; results of the survey; significant findings from the literature/patent search; review of additives for increasing the recovery efficiency of steam drive; review of significant technical literature; review of significant patents; and report on site visits. (ERA citation 05:008067)

SAND-78-0190 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Utilization of Magma Energy: A Project Summary.
J. L. Colp, and H. M. Stoller. Sep 79, 27p
Contract EY-76-C-04-0789

The scientific feasibility of extracting energy from magma bodies is the objective of this project. The high temperature (approx. 1000 exp 0 C) and estimated large resource (approx. 10 exp 4 quads) within 10 km of the surface in the US provides the incentive for this work. The areal extent of a near-surface molten lava body has been defined with geophysical sensing systems. Improved knowledge of the in situ physical properties of buried molten rock is required to assess the thickness of magma bodies. Drilling into molten lava is a complex operation and requires further technological development. Experimental studies of rock deformation at near-magma temperatures and pressures show that boreholes can be made to stay open. Calculational analyses of magmatic gas samples provide a satisfactory definition of the gas content of in situ magmas. Material compatibility experiments show that Ni- and Co-based alloys can survive and operate in the magma environment. Thermal heat exchangers can survive in molten rock and allow significant rates of heat transfer to an internal fluid. (ERA citation 05:000662)

SAND-79-0449 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Fields from a Vertical Magnetic Dipole Beneath a Layered Earth.
T. W. H. Caffey. Sep 79, 23p
Contract EY-76-C-04-0789

Both the E and H fields from a vertical magnetic dipole placed in the third layer of a three-layer earth are derived. The results are applied to transmission beneath two Wyoming coal seams to see the effects of the overburden upon the voltage induced in a horizontal loop which is coplanar with the dipole. Beneath each seam, the effects of the overburden can be neglected when both the dipole and loop are at least one meter below the seam and when the operating frequency is less than 15 kHz. (ERA citation 05:002401)

SAND-79-1342C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Aqueous Foams for Geothermal Drilling Fluids. I. Surfactant Screening.
P. B. Rand. 1979, 4p CONF-790906-2
Contract EY-76-C-04-0789
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

Aqueous foam is a promising drilling fluid for geothermal wells because it will not harm the producing formation and would eliminate the erosion problems of air drilling. Successful use of aqueous foam will require a high foaming surfactant which will: (1) be chemically stable in the harsh thermal and chemical environment, and (2) form stable foams at high temperatures and pressures. This paper presents the procedures developed to generate and test aqueous foams and the effects of a 260 exp 0 C temperature cycle on aqueous surfactant solutions. More than fifty selected surfactants were evaluated, with representatives from the amphoteric, anionic, cationic, and nonionic classes included. Most surfactants were severely degraded by this temperature cycle; however, some showed excellent retention of their properties. The most promising surfactant types were the alkyl and alkyl aryl sulfonates and the ethoxylated nonionics. (ERA citation 04:053092)

SAND-79-1398C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Sandia/DOE Geothermal Drilling and Completion Technology Development Program.
J. H. Barnette. 1979, 6p CONF-790906-1
Contract EY-76-C-04-0789
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

The high cost of drilling and completing geothermal wells is an impediment to the development of geothermal energy resources. Technological deficiencies in rotary drilling techniques are evidenced when drilling geothermal wells. The Division of Geothermal Energy (DGE) of the US Department of Energy (DOE) has initiated a program aimed at developing new drilling and completion techniques for geothermal wells. The goals of this program are to reduce well costs 25% by 1982 and 50% by 1986. Sandia Laboratories has managed this technology development program since October 1977, and this paper presents an overview of the program. A statement of program goals and structure is given. The content of the FY-79 program is presented and recent results of R and D projects are given. Plans for development of an advanced drilling and completion system are discussed. (ERA citation 04:048499)

SAND-79-1632 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Second Meeting of the Technical Advisory Panel.
B. E. Bader, R. L. Fox, and D. R. Johnson. Sep 79, 34p
Contract EY-76-C-04-0789

The second technical advisory panel meeting for the DEEP STEAM Project was held on January 31-February 1, 1979 in Albuquerque. The panel reviewed the status of the DEEP STEAM Project including injection string modifications, the downhole generator program, high pressure combustion experiments, and numerical simulations. Among the panel recommendations were: (1) the DOE EOR target in terms of depth of reservoirs, pressures, etc., be better defined, (2) that a mock-up run-in test of the multiple strings required for the downhole generator be performed, and (3) that the CO sub 2 /steam interaction be carefully examined both numerically and experimentally. (ERA citation 05:000121)

SAND-79-2091 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
DEEP STEAM Project. Quarterly Report for April 1-June 30, 1979.
B. E. Bader, R. L. Fox, D. R. Johnson, and A. B. Donaldson. Nov 79, 14p
Contract EY-76-C-04-0789

Objective of DEEP STEAM is to develop the technology required to economically produce heavy oil from reservoirs greater than 2500 feet in depth using steam injection. The technology includes: 1) methods of decreasing heat loss from injection strings and improving other well completion components and 2) development of downhole steam generation methods. Accomplishments during this reporting period were: evaluation of proposals for major research and development contract on thermal packers for DEEP STEAM operations; successful atmospheric testing of high pressure combustion chamber with indication of negligible soot production even under poor atomization conditions; site selection for the preliminary field test at Chevron Well 6 - 19 in Section 3 of Kern River Field, Bakersfield, CA; and low pressure reservoir simulation experiments using a freon gas as surrogate for high pressure carbon dioxide, which have produced recovery patterns similar to that predicted by computer simulation. (ERA citation 05:008068)

SRC-7017-3 PC **A02**/MF **A01**
Synergic Resources Corp., Bala-Cynwyd, PA.
Environmental Implications of Lignite Development. Final Report.
D. R. Limaye. Apr 79, 19p

This working paper summarizes the major environmental implications of lignite development in Arkansas and Louisiana. Most of the potential impacts relate to the surface mining operation and include: water resource impacts, erosion/sedimentation, land use, fugitive dust, ecological effects, historic and archaeological resources, and related effects. This working paper was prepared in support of the development of the Lignite Research Agenda for the Ozarks Regional Commission. Funds were provided by the US Department of Energy, Region VI Office. During the development of the Agenda, Synergic Resources Corporation personnel worked in close cooperation with and under the supervision of the Lignite Steering Committee. Members of this Steering Committee included representatives of the local economic development districts, the two state energy offices, state geological surveys and Commission staff. (ERA citation 05:002436)

UCID-18326 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
History of Prior Federal Action and NEPA Documentation for NCPA Project No. 2.
J. I. Daniels. Nov 79, 15p
Contract W-7405-ENG-48

The federal actions are documented that were performed to ensure environmental protection during the leasing, exploration, development and utilization of geothermal resources on those public lands of The Geysers KGRA in California associated with the proposed Northern California Power Agency (NCPA) Geothermal Project No. 2. Approval for development of these geothermal resources on public lands in The Geysers KGRA was preceded by extensive environmental analyses conducted over the past decade by the US Department of Interior, and its agencies. These analyses include the Environmental Impact Statement (EIS) for the Geothermal Leasing Program, an Environmental Analysis Record for the selected lease areas in The Geysers KGRA, and site specific Environmental Assessments. All of these documents were prepared to comply with policies, purposes, and goals of the National Environmental Policy Act (NEPA) of 1969 and pertinent state and local environmental protection standards. In addition, these documents contain the environmental protection stipulations which must be agreed to by Shell Oil Company (the geothermal steam provider) and NCPA (the electric power plant builder operator) before development and utilization can begin. (ERA citation 05:008390)

UCRL-15108 PC **A03**/MF **A01**
University of Southern California, Marina Del Rey.
Remote Sensing for Geothermal Environmental Assessments. Final Report.
W. Frei, T. Shibata, and G. C. Huth. 30 Jun 79, 35p
Contract W-7405-ENG-48

The role of remote sensing is examined in the context of the DOE Environmental Assessment Studies. Particular attention has been paid to the exploitation, by computer analysis, of low altitude aerial photographs, which had been made available for this project. One technique, change detection - developed during this project - has been found to be particularly useful, because it permits to detect environmental changes at a very early stage where it might escape detection on the ground. This technique, which has now been perfected to be usable on a routine basis, can thus provide a very effective environmental early warning capability. Several examples are shown in known Geothermal Resource Areas (KGRA's) in the Imperial Valley and the Geysers, California, which lead to the conclusion that remote sensing should become an essential tool for the Environmental Assessment Studies. (ERA citation 05:004457)

UCRL-81707 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Some Results from Continuum Mechanics Analyses of the Hydraulic Fracturing Process.
M. E. Hanson, and R. J. Shaffer. 1979, 23p
CONF-790514-1
Contract W-7405-ENG-48
Symposium on low-permeability gas reservoirs, Denver, CO, USA, 20 May 1979.

Theoretical, numerical models are being developed to analyze the hydraulic fracturing process. Applications include: fracturing near interfaces, effects of existing fractures near interfaces, porepressure effects, and stress-field changes due to embedded lenses. For a well-bonded interface, the calculations indicate that the stress-intensity factor of the leading crack tip decreases as the crack approaches a higher modulus material. As the tip crosses the interface into the higher modulus material, the stress-intensity factor abruptly increases to a higher value than it had in the lower modulus material. When the situation is reversed, the intensity factor increases as the tip approaches the interface and then abruptly decreases when the tip crosses the interface. Further calculations show that when existing cracks are present near the interface the effects of the change in material properties across the bonded interface are reduced. The analysis shows that increases in pore pressure due to leakage of fluids from the fracture into the surrounding media causes the stress-intensity factor to drop; a decrease in the stress-intensity factor means a reduction in the tendency to break. The stress-field disturbance caused by lenses of one material that are embedded in another material are analyzed, and calculations show that in regions that are not tectonically relaxed the stress field is modified by the lenses. It is concluded that the fracture geometry is modified by the presence of embedded lenses under these conditions. 17 figures. (ERA citation 04:038182)

VPI-SU-5648-4 PC **A08**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Geological Sciences.
Evaluation and Targeting of Geothermal Energy Resources in the Southeastern United States. Progress Report, July 1, 1978-September 30, 1978.
J. K. Costain, L. Glover, III, and A. K. Sinha. 1978, 158p
Contract ET-78-C-05-5648

The first results for the Atlantic Coastal Plain drilling program are reported by the Geophysics group for 17 holes drilled in New Jersey, Delaware, Maryland, and Virginia. Average geothermal gradients range from about 25 exp 0 C/Km to a high of 45 exp 0 C/Km. Three sites, Salisbury, MD, Crisfield, MD, and Wallops Island, VA, have sufficiently high thermal gradients to warrant further study to outline the thermal anomaly and to discover if they are associated with a potential field anomaly. Separate abstracts were prepared for 13 papers. (ERA citation 04:054561)

8J. Physical Oceanography

AD-A086 392/8 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Earth and Planetary Sciences
The Paleobathymetry of the Atlantic Ocean from the Jurassic to the Present,
John G. Sclater, Steven Hellinger, and Christopher Tapscott. 6 Nov 76, 46p
Contract N00014-75-C-0291
Pub. in Jnl. of Geology, v85 n5 p509-552 Sep 77.

No abstract available.

AD-A086 436/3 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory Palisades NY
Bathymetry of the Norwegian-Greenland Sea.
Journal article,
Gisle Groenlie, and Manik Talwani. 1979, 23p
Rept no. LDGO-2817
Contract N00014-67-A-0108-0004
Pub. in Geophysical Studies in the Norwegian-Greenland Sea, Norsk Polarist, Skrifter, n170 p3-24 1979.

No abstract available.

AD-A086 485/0 PC **A02**/MF **A01**
SACLANT ASW Research Centre La Spezia (Italy)
XBT Measurements Near the Sea Surface: Considerations for Satellite IR Comparisons and Data Bases,
Brian Wannamaker. 15 Jan 80, 19p Rept no. SACLANTCEN-SM-132

Expendable bathythermographs are often used where near-surface information is needed. This study considers the discrepancy between measured and actual temperature profiles in the first few metres of water. (Author)

AD-A086 676/4 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory Palisades NY
Jan Mayen Ridge and Iceland Plateau: Origin and Evolution.
Journal article,
Gisle Groenlie, Michael Chapman, and Manik Talwani. 1979, 25p Rept no. LDGO-2818
Contract N00014-67-A-0108-0004
Pub. in Geophysical Studies in the Norwegian-Greenland Sea, Norsk Polarist. Skrifter, n170 p25-47 1979.

No abstract available.

AD-A086 824/0 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
The Transparency of Southeast Asian and Indonesian Waters.
Master's thesis,
John H. Murdock. Mar 80, 161p

Secchi data (transparency) were obtained for Southeast Asian and Indonesian waters from 20 deg S to 30 deg N and from 90 deg E to 140 deg E. Some 10,269 points were used to determine the seasonal variation of transparency from specific subregions and depths. Seasonal and annual charts of Secchi depth (Z sub s) were made for 16 subregions. The irradiance attenuation coefficient (K) was computed from z sub s. Charts of Kd, the product of K and water depth, showed that some nearshore areas can be surveyed by laser bathymetry.

PB80-201692 PC **A07**/MF **A01**
Florida Univ., Gainesville. Marine Lab.
Multivariate Analysis of the MAFLA (Mississippi, Alabama, Florida) Water Column Baseline Data.
Final rept.,
F. J. Maturo, Jr., J. W. Caldwell, W. Ingram, III, and F. L. Hearne. Sep 75, 143p BLM/YM/ES-75/2
Contract DI-08550-CT5-27

In the MAFLA region, a strong correlation exists between the zooplankton community and its enviornment. Two general regimes of environmental factors weigh heavily in this strong correlation: (1) inshore-offshore factors, and (2) surface to bottom layering. Important components of inshore-off-

shore patterns include station depth, net range, and salinity range, all of which are associated with deeper, more offshore stations; whereas, net depth, temperature, and temperature and salinity range are associated with surface to bottom layering. In general, species assemblages found to be correlated with the environment are regulated either by depth factors or changes in salinity and temperature. The low correlation between the zooplankton community and suspended trace metals indicates the low trace metal levels in the MAFLA area are not an important factor governing zooplankton community structure. However, the variation of trace metals within the zooplankters themselves is highly dependent on the species composition of the zooplankton community. This suggests that different organisms are affected differentially by hydrocarbons.

PB80-201718 PC **A09**/MF **A01**
Gulf South Research Inst., New Orleans, LA. Dept. of Analytical Chemistry.
The Quality Control of Trace Metal Analysis for the MAFLA (Mississippi, Alabama, Florida) Environmental Survey.
Final rept.,
Mary M. McKown, and Joseph G. Montalvo, Jr. 1 Aug 75, 190p BLM/YM/ES-75-3
Contract DI-08550-CT4-15

A comprehensive quality control program was conducted by Gulf South Research Institute in support of the MAFLA Trace Metal Phase of the Baseline Environmental Survey. Five different types of marine environmental samples, chosen at random from the samples analyzed by the prime contractor, were submitted for quality control verification of eight different trace metals.

PB80-204811 PC **A03**/MF **A01**
National Advisory Committee on Oceans and Atmosphere, Washington, DC.
The International Decade of Ocean Exploration: A Mid-Term Review. A Report for the Director of the National Science Foundation by the National Advisory Committee on Oceans and Atmosphere, August 29, 1975.
29 Aug 75, 50p NACOA-4

The U.S. program for the IDOE, with which this report is concerned, has concentrated its effort in four scientific areas: environmental quality, which primarily involves chemical and biological aspects of the marine environment and marine pollution; environmental forecasting, which is concerned with oceanic motions and with interactions between ocean and the atmosphere; seabed assessment, which is concerned with the geology and geophysics of the sea floor and the processes of plate tectonics and metallogenesis; and living resources, which is concerned with marine ecosystems and the biological productivity of the oceans.

PB80-206089 PC **A04**/MF **A01**
National Advisory Committee on Oceans and Atmosphere, Washington, DC.
A Special Report to The President and The Congress: Reorganizing the Federal Effort in Oceanic and Atmospheric Affairs. Volume I: Findings and Recommendations.
Feb 79, 68p NACOA-7

The National Advisory Committee on Oceans and Atmosphere (NACOA) recommends the establishment of a department of oceans and atmosphere to help the Nation realize the potential of the oceans and the atmosphere for economic and social benefit. It urges that the Federal Government evaluate NACOA's proposal prior to reaching a decision on the proposal by the President's Reorganization Project (PRP) to commit the Nation to a Department of Natural Resources (DNR).

PB80-206097 PC **A14**/MF **A01**
National Advisory Committee on Oceans and Atmosphere, Washington, DC.
A Special Report to The President and The Congress. Reorganizing the Federal Effort in Oceanic and Atmospheric Affairs. Volume II: Background.
Mar 79, 316p NACOA-8

Volume II of a two-volume report on Federal organization for oceanic and atmospheric affairs is a collection of background material which resulted from a study by the National Advisory Committee on Oceans and Atmosphere. Volume II consists principally of 20 issue and option papers that were prepared in conjunction with two workshops. NACOA organized and conducted these workshops to provide multifaceted discussion and insight concerning the Federal role in the oceans and atmosphere, current problems, and possible solutions.

PB80-207467 PC **A04**/MF **A01**
National Advisory Committee on Oceans and Atmosphere, Washington, DC.
A NACOA Retrospective: 1971-1977.
Nov 77, 75p NACOA-1

In the 6 years of its existence, the National Advisory Committee on Oceans and Atmosphere (NACOA) has commented or advised on many oceanic and atmospheric issues of importance. These comments and recommendations have appeared in NACOA reports. The purpose is to introduce new members of the National Advisory Committee on Oceans and Atmosphere to the work of those who preceded them. Specific areas treated are: Coastal Zone Management, Energy, Environmental Interaction, Law of the Sea, Living Resources, Marine Transportation, Ocean Engineering, Ocean Science, Ocean and Atmospheric Policy, Planning, and Organization, and Weather Modification and Climate Change.

PB80-208945 PC **A16**/MF **A01**
Center for Natural Areas, South Gardiner, ME.
A Summary and Analysis of Environmental Information on the Continental Shelf and Blake Plateau from Cape Hatteras to Cape Canaveral (1977). Volume III. Appendix A: Ongoing Research and Programs. Appendix B: Data Gaps. Appendix C: Raw Data and Unworked Samples.
Final rept.
Aug 79, 370p BLM/YM/ES-79/28
Contract DI-AA550-CT7-39
See also Volume 2, PB80-201700.

A 12-month study by the Center for Natural Areas (CNA) was conducted to collect and analyze published, unpublished, and raw data as well as ongoing research programs from 1974 to present, relative to the marine environment of the outer continental shelf (OCS) and the Blake Plateau from Cape Hatteras, North Carolina to Cape Canaveral, Florida. The report is to be used to assess adequacy of the regional data base, and may be used in the design of environmental studies that the Bureau of Land Management (BLM) will direct in an attempt to assess and predict the possible effects of oil and gas development on the marine life and environment.

8K. Seismology

AD-A086 433/0 PC **A02**/MF **A01**
California Inst of Tech Pasadena Seismological Lab
Near-field Waveforms from and Arbitrarily Expanding, Transparent Spherical Cavity in a Prestressed Medium.
J. B. Minster. 28 Jun 78, 18p CONTRIB-3021, AFOSR-TR-80-0434
Contract F49620-77-C-0022
Pub. in Geophysical Jnl. of the Royal Astronomical Society, v56 p81-96 1979.

No abstract available.

AD-A086 887/7 PC **A02**/MF **A01**
Systems Science and Software La Jolla CA
A Source Model for the March 28, 1975, Pocatello Valley Earthquake from Time-Domain Modeling of Teleseismic P Waves,
Thomas C. Bache, David G. Lambert, and Terrance G. Barker. 10 Sep 79, 16p AFGL-TR-80-0201
Contract F19628-77-C-0004
Pub. in Bulletin of the Seismological Society of America, v70 n2 p405-418 Apr 80.

No abstract available.

N80-27871/6 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Applications of Satellite Data Relay to Problems of Field Seismology.
W. J. Webster, Jr., W. H. Miller, R. Whitley, R. J. Allenby, and R. T. Dennison. Apr 80, 112p NASA-TM-80673
Submitted for Publication.

A seismic signal processor was developed and tested for use with the NOAA-GOES satellite data collection system. Performance tests on recorded, as well as real time, short period signals indicate that the event recognition technique used is nearly perfect in its rejection of cultural signals and that data can be acquired in many swarm situations with the use of solid state buffer memories. Detailed circuit diagrams are provided. The design of a complete field data collection platform is discussed and the employment of data collection platforms in seismic network is reviewed.

N80-27874/0 PC **A10**/MF **A01**
European Space Agency, Paris (France).
European Earthquake Prediction Program.
T. D. Guyenne, and G. Levy. Mar 80, 218p ESA-SP-156
Partly in English and French. Prepared Jointly with Council of Europe, Strasbourg, France. Proceedings of Council of Europe Parliamentary Assem. And Esa Workshop on European Earthquake Prediction Program, Strasbourg, 31 Jan. - 1 Feb. 1980.

No abstract available.

N80-27892/2 PC **A03**/MF **A01**
Preussag A.G., Erdoel und Erdgas, Hannover (Germany, F.R.).
Investigation of Wave Frequency at Different Travel Times.
Final Report.
G. Babbel, L. Engelhard, and C. Schimanowski. Dec 79, 42p BMFT-FB-T-79-77
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

No abstract available.

PB80-207293 PC **A06**/MF **A01**
World Data Center A for Solid Earth Geophysics, Boulder, CO.
Summary of Earthquake Focal Mechanisms for the Western Pacific-Indonesian Region, 1929-1973,
David Denham. Mar 77, 118p SE-3, NOAA-80060302
Prepared in cooperation with Bureau of Mineral Resources, Canberra City (Australia). Geodynamics Project-Scientific Report No. 28, prepared under the auspices of Working Group 1 of the Inter-Union Commission on Geodynamics.

The purpose of the catalogue is to provide a comprehensive list of available mechanisms and to serve as a starting point for further tectonic studies in the area of interest. This catalogue contains 1,713 solutions from 48 data sources for the Western Pacific-Indonesian Region. Most are from earthquakes that took place since 1960, when the worldwide standard seismograph system started to become operational. However, a few solutions for earlier earthquakes are included where it is thought that they are based on reliable observations. The earliest earthquake in the table occurred on June 2, 1929, south of Nagoya, Japan. The catalogue is arranged to include the data source, date and time (UT), epicenter, and magnitude of the earthquake, either MB, ML, or MS.

UCID-18191 PCE03//MF **E03**
California Univ., Livermore. Lawrence Livermore Lab.
Remote System Software.
T. H. Gong. 17 May 79, 27p
Contract W-7405-ENG-48

This document is a collection of notes and software documentation describing the Lawrence Livermore Laboratory Digital Seismic System (DS exp 2). The system consists of four remote stations in California, Nevada, and Utah that transmit seismic data to the Livermore central computer. 3 figures. (ERA citation 05:003673)

8L. Snow, Ice, and Permafrost

AD-A086 299/5 PC **A06**/MF **A01**
Fleet Weather Facility Suitland MD
Antarctic Ice Charts, 1977-1978.
1978, 106p

The advent of high resolution satellite imagery combined with the ground truth of conventional observations has in recent years provided description of the polar ice fields on a semi-synoptic scale. Since 1970, the Fleet Weather Facility at Suitland, Maryland has prepared operational analyses and forecasts of ice conditions in the Arctic and Antarctic for the Department of Defense and various other users. The results of these efforts are contained herein. The charts were constructed by Navy ice analysts under operational time constraints from satellite imagery and conventional data. Reanalysis with late data was not normally attempted; rather the current analysis was prepared incorporating this to the extent possible. The analysis was compared with available climatology in an attempt to eliminate gross errors. Scanning radiometer imagery, visual and infrared, from the National Oceanic and Atmospheric Administration (NOAA) satellites and microwave radiometer data from the NIMBUS V research satellite were the primary data sources. Limited use of the Earth Resources LANDSAT and Defense Meteorological Satellite Program (DMSP) imagery as well as conventional observations were utilized. The 19.35 GHZ microwave radiometer with 25 kilometer (KM) resolution aboard NIMBUS V provided an ice edge and limited inner pack conditions. This was the basic data source during the polar night and over areas dominated by persistent cloud cover. During the seasons with adequate light, visual data from the Very High Resolution Radiometer (VHRR) with 1 KM resolution and the 4 KM resolution data from the Scanning Radiometer aboard NOAA satellites were utilized.

AD-A086 375/3 MF **A01**
Naval Polar Oceanography Center Washington DC
Eastern-Western Arctic Sea Ice Analysis.
1979, 214p
Availability: Microfiche copies only.

The purpose of this atlas is to provide operators and researchers with reliable weekly hemispheric ice analyses. Satellite data limitations and other difficulties involved in manually synthesizing various forms of ice data have evolved the following analysis procedures: (1) Conventional shore station, ship, and aerial ice reconnaissance observations are plotted on base charts and evaluated for timeliness; (2) Satellite data is analyzed for ice information content, with the most recent and highest resolution considered first. Synthesis of conventional with satellite data yields the final analysis; and (3) Where sufficient data is not available to define the sea ice limit, an estimated ice boundary is depicted. After one week of no data availability the ice edge position is based on analyzed theoretical ice drift data and other diagnostic aids. During subsequent weeks of no data availability the ice edges approach seasonal mean positions.

AD-A086 441/3 PC **A04**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
The Development of Snow Properties and Its Effect on Trafficability.
Technical note,
Gerald J. Irwin. Apr 80, 59p Rept no. DREO-TN-80-8
Abstract in French.

The properties of a given snowpack were monitored throughout a winter season in order to identify some of the factors most affecting vehicle mobility over snow. This activity was carried out as an aid to developing an improved snow classification system for purposes of mobility and to assess the use of snow strength testing devices as part of such a system. Snowpit data were collected at the Land Engineering Test Establishment, DND Ottawa, during the winter of 1976-77 in combination with penetrometer tests of snow strength and studies of the tractive performance of an RN25-35 tracked carrier. It was found that temperature and free water content are the snow factors which are highly transient while changes in depth, density, grain size distribution, grain shape, crustal layer and bearing strength are usually perceptible over a period of days to weeks. As the winter season progresses snow strength undergoes a general increase with snow density while snow temperature approaches uniformity and crusts become more numerous. Grain shape and size distribution are indicative of the stages of snow metamorphism. Penetrometer shortcomings are enumerated with a recommendation for greater automation in snow strength testing. Recommendations are also made for the most convenient environmental conditions for purposes of comparing the performance of vehicles. (Author)

E80-10145 PC **A02**/MF **A01**
Environmental Research and Technology, Inc., Concord, MA.
Investigation of the Application of HCMM (Heat Capacity Mapping Mission) Thermal Data to Snow Hydrology.
Quarterly progress rept. no. 10, 1 Jan-31 Mar 80, James C. Barnes. Apr 80, 19p ERT-P-2061-10, NASA-CR-163163
Contract NAS5-24316

The author has identified the following significant results. Analysis of HCMM digital thermal data for daytime passes over the Salt-Verde Water-shed area on five dates show a gradual depletion of snow cover in the watershed (and in the Little Colorado Watershed to the north) from a maximum on February 9th to a nearly complete disappearance of the snow pack by April 15th. Temperature contours correspond closely with the snowline observed in the visible image.

E80-10164 PC **A02**/MF **A01**
Bern Univ. (Switzerland). Dept. of Geography.
Topoclimatological and Snowhydrological Survey of Switzerland.
Progress rept. no. 2,
Matthias Winiger. Apr 80, 6p NASA-CR-163181

The author has identified the following significant results. Low temperature zones depend on the topography and the terrain coverage type (besides the meteorological situation). The usual pattern of cold zones at the bottom of the valleys, warmer belts along the valley slopes, and cold mountain tops is modified by the terrain coverage type. Rural and forested areas normally have different surface temperatures, but along a vertical profile the temperature decrease (or increase) is often of the same order of magnitude. Because there is also a close correlation between the topography and terrain coverage (high percentage of forested areas at the valley slopes up to the timber line, much less along the valley floors), the surface temperature of the warm slope zone is increased compared to a valley profile with uniform coverage.

E80-10167 PC **A13**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Operational Applications of Satellite Snow-cover Observations.
Conference pub.,
Albert Rango, and Ralph Peterson. May 80, 295p NASA-CP-2116
Proceedings of a final workshop held at Sparks, Nevada, April 16-17, 1979. Prepared in cooperation with Nevada Univ., Reno, and General Electric Co., Beltsville, MD. Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, SD. 57198.

The history of remote sensing of snow cover is reviewed and the following topics are covered: various techniques for interpreting LANDSAT and NOAA satellite data; the status of future systems for continuing snow hydrology applications; the use of snow cover observations in streamflow forecasts by Applications Systems Verification and Transfer participants and selected foreign investigators; and the benefits of using satellite snow cover data in runoff prediction.

N80-27779/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Snowpack Monitoring in North America and Eurasia Using Passive Microwave Satellite Data.
J. L. Foster, A. Rango, and D. K. Hall. 1980, 23p NASA-TM-80706
Submitted for Publication.

Areas of the Canadian high plains, the Montana and North Dakota high plains, and the steppes of central Russia were studied in an effort to determine the utility of spaceborne electrical scanning microwave radiometers (ESMR) for monitoring snow depths in different geographic areas. Significant regression relationships between snow depth and microwave brightness temperatures were developed for each of these homogeneous areas. In the areas investigated, Nimbus 6 (.081 cm) ESMR data produced higher correlations than Nimbus 5 (1.55 cm) ESMR data in relating microwave brightness temperature and snow depth from one area to another because different geographic areas are likely to have different snowpack conditions.

PB80-202500 PC **A03**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Numerical Simulation of Snow Avalanche Impact on Structures.
Forest Service research paper (Final),
T. E. Lang, and R. L. Brown. Jun 80, 28p FSRP-RM-216
Prepared in cooperation with Montana State Univ., Bozeman.

A computer model to predict snow avalanche impact on rigid wall structures is developed based on hydrodynamic equations for viscous flow, and admitting a frictional slip-plane lower boundary. Slope normal and vertical wall configurations which extend higher than the height of avalanche flow are evaluated for normal and shear force and overturning moment from avalanche impact. Impact forces and moment time depend upon avalanche leading edge shape.

PB80-202765 PC **A04**/MF **A01**
World Data Center A for Glaciology, Boulder, CO.
World Data Center A Activities,
Roger G. Barry. Dec 78, 68p GD-3, NOAA-80052906
Prepared in cooperation with Colorado Univ. at Boulder. Inst. of Arctic and Alpine Research. See also report dated Dec 78, PB-293 521.

World Data Center (WDC)-A for Glaciology (Snow and Ice) serves as an archive for both published and unpublished data on snow and ice. It is developing automated systems for the storage and retrieval of bibliographic and quantitative data. Computerized literature searches on any topic related to snow and ice are also available. The Center publishes Glaciological Data several times a year. Most issues contain a specialized bibliography and related data information on a single theme. With the development of a computerized classification scheme for glaciological indexing, computer-aided information retrieval of documents, photographs, and other material will be provided.

PB80-203896 PC **A04**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Applications of Remote Sensing to Oceanography and Sea Ice. Volume 14, Number 2,
Ragnar Thoren. 1980, 74p FOA-B-60001-M7, ISBN-91-7056-054-4
Prepared as a Paper to the Congress of the International Society of Photogrammetry (14th), Hamburg 1980, Commission VII, Working Group VII, 4, 'Oceanography and Sea Ice', Germany, F.R., July 13-26, 1980.

The importance of exploring our natural resources in the Arctic and other areas where the sea is often blocked by floating ice is stressed. The exploitation and transportation of arctic oil, gas, and minerals is dealt with. The study treats the different types of ships developed for arctic expeditions and explores advanced remote sensing equipment available for use in heavily iced waterways.

8M. Soil Mechanics

E80-10123 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.

Microwave Remote Sensing of Soil Moisture Content Over Bare and Vegetated Fields.
Technical memo.,
J. R. Wang, J. C. Shiue, and J. E. McMurtrey, III.
Mar 80, 17p NASA-TM-80669
Prepared in cooperation with Agricultural Research Center, Beltsville, MD.

The author has identified the following significant results. Ground truth of soil moisture content, and ambient air and soil temperatures were acquired concurrently with measurements of soil moisture in bare fields and fields covered with grass, corn, and soybeans obtained with 1.4GHz and 5GHz radiometers mounted on a truck. The biomass of the vegetation was sampled about once a week. The measured brightness temperatures over the bare fields were compared with those of radiative transfer model calculations using as inputs the acquired soil moisture and temperatures data with appropriate values of dielectric constants for soil-water mixtures. A good agreement was found between the calculated and measured results over 10deg to 70deg incident angles. The presence of vegetation reduced the sensitivity of soil moisture sensing. At 1.4 GHz the sensitivity reduction ranged from about 20% for 10-cm tall grassland cover to over 50 to 60% for the dense soybean field. At 5GHz the corresponding reduction in sensitivity ranged from approximately 70% to approximately 90%.

E80-10134 PC **A06**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
Physicochemical, Site, and Bidirectional Reflectance Factor Characteristics of Uniformly Moist Soils.
Technical rept.,
Eric R. Stoner, and Marion F. Baumgardner. Feb 80, 105p LARS-111679, NASA-CR-160571
Contract NAS9-15466
Sponsored in part by Department of Agriculture, Washington, DC., Department of Commerce, Washington, DC., and Department of the Interior, Washington, DC. Report on AgRISTARS.

The author has identified the following significant results. The bidirectional reflectance factor (0.5 micron m to 2.3 micron m in wavelength interval) and physiochemical properties of over 500 soils from 39 states, Brazil and Spain were measured. Site characteristics of soil temperature regime and moisture zone were used as selection criteria. Parent material and internal drainage were noted for each soil. At least five general types of soil reflectance curves were identified based primarily on the presence or absence of ferric iron absorption bands, organic matter content, and soil drainage characteristics. Reflectance in 10 bands across the spectrum was found to be negatively correlated with the natural log of organic matter content.

E80-10142 PC **A02**/MF **A01**
London Univ. (England).
HCMM (Heat Capacity Mapping Mission) Imagery for the Discrimination of Rock Types, the Detection of Geothermal Energy Sources and the Assessment of Soil Moisture Content in Western Queensland and Adjacent Parts of New South Wales and South Australia.
Progress rept.,
Monica M. Cole. 28 Feb 80, 7p NASA-CR-163160

The author has identified the following significant results. Day-visible and day-IR imagery of northwest Queensland show that large scale geological features like the Mitakoodi anticlinorium which involves rocks of contrasting lithological type, can be delineated. North of Cloncurry, the contrasting lithological units of the Knapdale quartzite and bedded argillaceous limestones within the Proterozoic Corella sequence are clearly delineated in the area of the Dugald River Lode. Major structural features in the Mount Isa area are revealed on the day-visible cover which provides similar but less detailed information than the LANDSAT imagery. The day-IR cover provides less additional information for areas of outcropping bedrock than had been expected. Initial studies of the day-IR and night-IR cover for parts of South Australia suggest that they contain additional information on geology compared with the day-visible cover.

E80-10163 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Geology.

HCMM (Heat Capacity Mapping Mission): Soil Moisture in Relation to Geologic Structure and Lithology, Northern California,
Ernest I. Rich. 21 Apr 80, 3p NASA-CR-163180
Contract NAS5-24479

The author has identified the following significant results. Empirical observations on the ground and examination of aerial color IR photographs indicate that in grassland terrain, the vegetation overlying sandstone tends to become less vigorous sooner in the late spring season than does the area overlain by an adjacent shale unit. The reverse relationship obtains in the fall. These relationships are thought to be a reflection of the relative porosity of each of the units and hence of their ability to retain or lose soil moisture. A comparison of the optically enlarged day and nite IR imagery of the Late Mesozoic interbedded sandstone and shale units along the western margin of the Sacramento Valley, California, taken at seasonally critical times of the year (late spring/early summer and late fall/early winter) reveals subtle seasonal variations of graytone which tend to support the empirical observations after consideration of sun angle and azimuth, and the internal consistency of the data on each set of satellite imagery.

N80-27777/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
A Comparison of Radiative Transfer Models for Predicting the Microwave Emission from Soils.
T. J. Schmugge, and B. J. Choudhury. May 80, 32p NASA-TM-80688, G-F4504
Submitted for Publication.

Two general types of numerical models for predicting microwave emission from soils are compared-coherent and noncoherent. In the former, radiation in the soil is treated coherently, and the boundary conditions on the electric fields across the layer boundaries are used to calculate the radiation intensity. In the latter, the radiation is assumed to be noncoherent, and the intensities of the radiation are considered directly. The results of the two approaches may be different because of the effects of interference, which can cause the transmitted intensity at the surface (i.e., emissivity) to be sometimes higher and sometimes lower for the coherent case than for the noncoherent case, depending on the relative phases of reflected fields from the lower layers. This coupling between soil layers in the coherent models leads to greater soil moisture sampling depths observed with this type of model, and is the major difference that is found between the two types of models. In noncoherent models, the emissivity is determined by the dielectric constraint at the air/soil interface. The subsequent differences in the results are functions of both the frequency of the radiation being considered and the steepness of the moisture gradient near the surface. The calculations were performed at frequencies of 1.4 and 19.4 GHz and for two sets of soil profiles. Little difference was observed between the models at 19.4 GHz; and only at the lower frequency were differences apparent because of the greater soil moisture sampling depth at this frequency.

N80-27780/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Remote Sensing of Soil Moisture Content over Bare Fields at 1.4 Ghz Frequency.
J. R. Wang, and B. J. Choudhury. Jun 80, 26p NASA-TM-80711
Submitted for Publication.

A simple method of estimating moisture content (W) of a bare soil from the observed brightness temperature (T sub B) at 1.4 GHz is discussed. The method is based on a radiative transfer model calculation, which has been successfully used in the past to account for many observational results, with some modifications to take into account the effect of surface roughness. Besides the measured T sub B's, the three additional inputs required by the method are the effective soil thermodynamic temperature, the precise relation between W and the smooth field brightness temperature T sub B and a parameter specifying the surface roughness characteristics. The soil effective temperature can be readily measured and the procedures of estimating surface roughness parameter and obtaining the relation between W and smooth field brightness temperature are discussed in detail. Dual polarized radiometric measurements at an off-nadir incident angle are sufficient to estimate both surface roughness parameter and W, provided that the relation between W and smooth field brightness temperature at the same angle is known. The method of W estimate is demonstrated with two sets of experimental data, one from a controlled field experiment by a mobile tower and the other, from aircraft overflight. The results from both data sets are encouraging when the estimated W's are compared with the acquired ground truth of W's in the top 2 cm layer. An offset between the estimated and the measured W's exists in the results of the analyses, but that can be accounted for by the presently poor knowledge of the relationship between W and smooth field brightness temperature for various types of soils. An approach to quantify this relationship for different soils and thus improve the method of W estimate is suggested.

PB80-204670 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Water Resources Center.
Dynamic System for Measuring Soil-Moisture Characteristics at Various Temperatures.
Technical rept.,
J. R. Nimmo, E. E. Miller, and W. R. Gardner. 1980, 41p WIS-WRC-80-11, W80,-06077, OWRT-A-072-WIS(1)
Contracts DI-14-34-0001-7105, DI-14-34-0001-7106
Sponsored in part by Grant DI-14-34-0001-8053.

Many methods have been devised for measuring soil moisture characteristics, but few have yielded complete characteristics--i.e., sets of values for all three properties for wetting, drying, and intermediate-reversal (scanning-curve) conditions. The isothermal moisture characteristics of soils are considerably more difficult to measure for 'real'-soils than for glass-bead media. The objective of this work was to utilize modern technical developments for performing these measurements.

PB80-209489 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
Abiological Methylation of Mercury in Soil.
Journal article,
Robert D. Rogers. 1977, 8p EPA-600/J-77-146
Pub. in Jnl. of Environmental Quality, v6 n4 p463-467 1977.

The results from this work define several factors influencing the methylation of mercuric ion in soil. Two of the most important findings were that is is possible to extract the mercury methylating factor from soil with a solution of 0.5/V sodium hydroxide (NaOH) and that this factor is responsible for the abiological methylation of Hg in the soils under investigation.

8N. Terrestrial Magnetism

CBPF-A0006/78 PC **A02**/MF **A01**
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Weathering Model in Paleomagnetic Field Intensity Measurements on Ancient Fired Clays.
I. Singalas, N-H. J. Gangas, and J. Danon. Mar 78, 10p
U.S. Sales Only.

Nonlinearities observed in Thellier's plots are explained in terms of a weathering model. This model is based on the reduction in size of the originally present iron oxide particles, due to leaching. In the general case, the slope of the Thellier's plot is a function of the particle size distributions of the magnetic particles, both newly formed and leached ones. In the special case in which the newly formed magnetic particles are superparamagnetic, the limiting value of the slope of the Thellier's plot towards the magnetic ordering temperature is equal to the ratio of the ancient field intensity to the modern one. (Atomindex citation 10:429903)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A086 326/6 PC **A04**/MF **A01**
Georgia Inst of Tech Atlanta
Adaptive Time Delay Circuitry for Interference Cancellation Systems.
Final technical rept. 30 Oct 78-31 Oct 79,
Donald E. Clark, and William A. Hardell. Apr 80, 56p GIT-A-2287(F), RADC-TR-80-114
Contract F30602-78-C-0120

The objective of this research program was to study and investigate variable time delay techniques for use in interference cancellation systems so as to improve their performance. A comprehensive survey of past research pertaining to HF, VHF, and UHF variable time delay techniques was undertaken. The survey also included microwave variable time delay techniques that are adaptable to the lower bands. As part of this program, variable delay lines were constructed and experimental measurements performed. Specifically, two types of delay lines were investigated, one using a coaxial transmission section with a helix surrounding a ferrite rod and the other a powdered ferrite and dielectric loaded coaxial section. The report presents experimental results over the HF, VHF, and UHF bands. (Author)

AD-A086 333/2 PC **A02**/MF **A01**
Naval Underwater Systems Center Newport RI
The Magnetic Characteristics of Tape Wrapped Cylindrical Ferromagnetic Laminations for Frequencies Below 50 KHz,
Louis J. Dalsass. 22 Feb 80, 19p Rept no. NUSC-TM-791227

The leakage magnetic fields from magnetic devices are known to create EMI problems for sensitive shipboard VLF receivers and sonar equipment. Devices which contain ferromagnetic cores can be particularly significant EMI offenders because of the high flux densities available in their magnetic circuits. This memorandum discusses the magnetic characteristics of various laminated cores found in shipboard equipment (with source frequencies extending into the VLF band). Test results are presented for an open tape cylindrical lamination containing an axial and radial air gap. Although this is a more complicated magnetic circuit, its behavior is shown to be identical to predictions derived for simple lamination shapes without air gaps for frequencies up to 50 kHz. (Author)

AD-A086 344/9 PC **A11**/MF **A01**
Raytheon Co Quincy MA Industrial Components Operation
Manufacturing Methods and Technology Engineering (MM and TE) Program for the Establishment of Production Techniques for High Density Thick Film Circuits used in Crystal Oscillators. Volume II.
Final rept. Aug 76-Aug 79,
R. Michel Zilberstein. Apr 80, 248p DELET-TR-76-8119-F-VOL-2
Contract DAAB07-76-C-8119
See also Volume 1, AD-A086 022.

This report compiles the process specifications which define equipment, materials and procedures related to various significant processes employed in manufacture of high density thick film crystal oscillators. (Author)

AD-A086 345/6 PC **A22**/MF **A01**
Auburn Univ AL Dept of Physics
Second Breakdown Susceptibility of Silicon-On-Sapphire Diodes having Systematically Different Geometries.
Final rept. 1 Jun 77-31 Dec 79,
Paul P. Budenstein, Aradhana Baruah, Edward R. Knight, and Fu-Tai Liou. 30 May 80, 525p ARO-15840.3-A-EL
Grants DAAG29-78-G-0111, DAAG29-77-G-0189

Experiments were performed on thin films silicon-on-sapphire (SOS) diodes (p(+) - n - n(+)) to determine the roles of geometry and doping level (ten to the 15th power to ten to the 17th power atoms/cubic centimeters) on current configurations, second breakdown susceptibility, and damage morphology. Geometric parameters varied including diode width, n-region length, n-region doping density, diffusion spikes of different sizes and configurations on the n(+)n or p(+)n interfaces, contact spikes at the n(+)-metal and p(+)-metal interfaces, and a variety of other current concentration geometries. Prior to the present study, the effectiveness of junction defects in reducing resistance to second breakdown was not known. However, it was suspected that such defects might result in 'maverick' devices, that is, devices which fail much below their rated electrical parameters. SOS diodes, specially fabricated by Rockwell International, were tested using Sunshine's stroboscopic technique. This method exploits the decrease of the optical transmittancy of silicon with increasing temperature.

AD-A086 415/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Effects of Fringing Fields on the Capacitance of Circular Microstrip Disk,
Weng Cho Chew, and J. A. Kong. 16 Apr 79, 8p
Contract DAAG29-78-C-0020
Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT28 n2 p98-104 Feb 80.

No abstract available.

AD-A086 422/3 PC **A03**/MF **A01**
Varian Associates Inc Palo Alto CA Solid State Lab
Submicron FETs Using Molecular Beam Epitaxy.
Annual rept. no. 2, Aug 78-Aug 79,
S. Bandy, D. Collins, and C. Nishimoto. Aug 79, 44p
Contract N00014-77-C-0655
See also AD-A071 396.

Electron-beam exposure and MBE material have been used to achieve quarter-micron gate length GaAs FETs. A noise figure of 1.5 dB with an associated gain of 15 dB has been measured at 8 GHz. (Author)

AD-A086 443/9 PC **A03**/MF **A01**
California Univ Berkeley Dept of Physics
Superconductive Devices for Millimeter Wave Detection Mixing and Amplification,
P. L. Richards, and T-M. Shen. 1980, 48p
Contract N00014-75-C-0496

Single particle (quasiparticle) tunneling through an insulating barrier between two superconductors or between a superconductor and a normal conductor is being used to make very low noise detectors and mixers for millimeter wavelengths. The nonlinearity of the I-V curve obtained from tunneling between two superconductors can be so strong that classical theory breaks down and photon assisted tunneling theory must be used to understand device performance. Quantum theory predicts that a quasiparticle tunnel junction can be operated as a microwave photon detector with quantum efficiency close to unity or as a heterodyne mixer with conversion gain and with mixer noise temperature comparable with the quantum noise limit T sub M = h omega/k. Both of these predictions have been experimentally realized at 36GHz using superconductor-insulator-superconductor junctions. It appears probable that these quasiparticle detectors and mixers will supercede the corresponding Josephson effect devices at millimeter wavelengths. (Author)

AD-A086 527/9 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Computation Mathematics/Logistics Dept
Power Losses in Liquid Metal Current Collectors.
Final rept. Oct 78-Mar 80
Myles M. Hurwitz, and Dolores R. Wallace. May 80, 27p Rept no. DTNSRDC/CMLD-80/10

A numerical capability has been developed which will compute ohmic and viscous power losses in liquid metal current collectors. The present work extends previous analytical investigations in that semi-infinite collector geometries are no longer assumed. This new capability, is based on the finite element method and makes use of electrical current densities computed by the heat transfer portion of the NASTRAN structural analysis program. Although some limitations and questions remain, a comparison between the new numerical capability and experiment shows very good agreement in the computation of the power losses. (Author)

AD-A086 634/3 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Resonance of the Axial-Symmetric Modes in Microstrip Disk Resonators,
W. C. Chew, and J. A. Kong. 17 Aug 79, 12p
Contract DAAG29-78-C-0020
Pub. in Jnl. of Mathematics and Physics, v21 n3 p582-591 Mar 80.

No abstract available.

AD-A086 668/1 PC **A05**/MF **A01**
Texas Instruments Inc Dallas
Reliability Evaluation of GaAs Power FETs.
Interim rept. 7 Nov 78-6 Nov 79,
H. M. Macksey, and L. W. Joy. Apr 80, 91p TI-08-80-06, RADC-TR-80-124
Contract F30602-79-C-0037

The devices chosen for this study were the TI MSX802 and laboratory devices, Dexcel 3615A-P100F, MSC 88002, and NEC 868196. All are hermetically packaged GaAs power FETs with approximately 0.5 W output power. The study includes device physical, electrical (cw and pulsed), and environmental characterization, electrical (cw and pulsed) and environmental stress tests, and failure analysis. The device physical characterization has been completed and the data are presented. The cw electrical characterization is almost complete, and detailed data are shown for a typical device. No device had significant changes in electrical parameters following operation for 1000 hours at room temperature. The environmental characterization has just begun, and no results are available yet. The results from the cw electrical stress tests, which have been completed, are presented. There are some correlations between the various device structures and the results from different manufacture's devices. The environmental stress tests have begun, and preliminary results are presented. Most of the effort for the remainder of the program will be spent on completing these tests. The pulse characterization and stress tests have not yet begun. The failure analyses are described along with the test causing the failure. (Author)

AD-A086 734/1 PC **A06**/MF **A01**
Motorola Inc Scottsdale AZ Government Electronics Div
Doubly Rotated Cut SAW Devices.
Interim rept. no. 1, 15 Aug 79-1 Mar 80,
D. F. Williams, and F. Y. Cho. Jun 80, 119p DELET-TR-79-0275-1
Contract DAAK20-79-C-0275

The objective of this program is the exploratory development of doubly rotated cuts of quartz possessing superior Surface Acoustic Wave (SAW) properties for applications involving environmentally hardened devices. The key properties examined and optimized both theoretically and experimentally are: first, second and third order Temperature Coefficients of Delay (TCD), piezoelectric coupling factor, power flow angle, Bulk Acoustic Wave (BAW) inverse velocity surfaces, degeneracies and leaky waves, and sensitivities of the above quantities to misorientations and manufacturing tolerances. The program consists of two major task areas comprising an interactive numerical/experimental approach. Task I involves the numerical computation of the key SAW properties for doubly rotated quartz substrates for the purpose of

locating promising angular ranges with properties superior to the singly rotated cuts now in existence. More detailed calculations follow to refine the angular coordinates in order to specify cuts for experimental verification in Task II. In Task II, sets of substrates with promising orientations identified in Task I will be prepared and SAW device patterns will be fabricated for evaluation of the key SAW properties. The experimental results of this task will be correlated with the theoretical predictions and an iterative process develops for refinement of both theoretical and experimental parameters. As the program proceeds, working SAW device models will be delivered as a demonstration of progress and an indication of the future potential of the doubly rotated cuts.

AD-A086 761/4 PC **A05**/MF **A01**
Westinghouse Defense and Electronic Systems Center Baltimore MD Systems Development Div
High Voltage Switch Using Externally Ionized Plasmas.
Final technical rept. 26 Jun 78-21 Dec 79,
John W. Dzimianski, and Laurence E. Kline. Apr 80, 80p DYD-55585-AA, AFWAL-TR-80-2041
Contract F33615-78-C-2010

A physical model was developed and the performance parameters were studied for high-voltage high-current on/off switches which use the low energy secondary electrons in an electron beam (e-beam) sustained discharge as the conducting medium. The model equations are presented and described along with the underlying physical assumptions. Electron transport data and static breakdown voltages were calculated for N2, Ar, a N2:Ar = 1:9 mixture and CH4 by numerically solving the Boltzmann equation to find the energy distribution. Study of steady state performance for N2, Ar, N2:Ar = 1:9 and CH4 indicated that the N2:Ar = 1:9 and CH4 were both good candidate gases; hence transient switch performance was studied for these two gases. The performance of the e-beam plasma switches were mapped in a regime where the power delivered to the load is much greater than the e-beam power. Study of e-beam sources pointed to the thin-film field emission cathode as offering a means of controlling e-beam plasma switches with very high control power gain. A switch geometry was suggested using such an e-beam source. The comparison of different switch types with on/off capability indicated that the e-beam externally ionized plasma switches have the potential to be developed into devices that would be competitive or superior in size and capability with any other approach providing equivalent electrical performance. (Author)

KFK-2676 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik.
Investigation of the Temperature and Frequency Dependence of the Surface Resistance of Superconducting Nb-Resonators Between 12 and 18 GHz.
W. Meyer. Aug 78, 59p
In German. Thesis.
U.S. Sales Only.

Up to now, all measurements on superconducting niobium cavities are restricted to the frequency range below 12 GHz. This paper reports on the investigation of the temperature and frequency dependence of the surface resistance of superconducting niobium between 12 and 18 GHz. Besides the study of TM modes, which are important for accelerators, TE modes have been measured also to be able to discriminate between different loss mechanisms. The dimensions D = L = 40 mm are choosen so that the cavity is operated in higher order modes. Thereby the fabrication, especially of the coupling, and the handling of the cavity is simplified. We use a fixed magnetic hole coupling. Because the cavity was fabricated in a flanged and in a welded model, the influence of a joint could also be studied. After subtracting the residual resistance Rsub(res) the measured values obtained by the newly installed RF set-up fit in temperature and frequency dependence the superconducting surface resistance Rsub(s1) in the framework of the BCS-theory. The gap parameter delta /kTsub(c) determined from the temperature dependence lies between 1.94 and 1.98. The frequency dependence of Rsub(s1) shows with Rsub(s1) approximately f exp 1 . exp 62 the expected for Nb shape. The highest Q sub 0 in the flanged cavity was 1.7 x 10 exp 9 (f sub 0 = 13.260 GHz) and in the welded one 1.8 X 10 exp 9 (f sub 0 = 13.310 GHz), measured in each case in a TE mode at T = 1.3 K. The residual resistance increases with f exp 2 and stronger and is especially high in the flanged cavity in modes with currents across the joint. (Atomindex citation 10:428451)

LPC-78-07 PC **A02**/MF **A01**
College de France, Paris. Lab. de Physique Corpusculaire.
Realization of a Pulsed Light Source with Temperature Independant Intensity Between +10 exp 0 C and +40 exp 0 C.
R. Bruere-Dawson, and A. Patiou. 1978, 24p
In French.
U.S. Sales Only.

A simple system for temperature stabilization of a L.E.D. is described in view of getting a stable pulsed light source. (Atomindex citation 11:497310)

PATENT-4 162 227
Not available NTIS
Department of Energy, Washington, DC.
Dielectric Gas Mixtures Containing Sulfur Hexafluoride.
Patent,
C. M. Cooke. Filed 24 Feb 76, patented 24 Jul 79, 6p PAT-APPL-660 887
Supersedes PAT-APPL-660 887-76.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Electrically insulating gaseous media of unexpectedly high dielectric strength comprised of mixtures of two or more dielectric gases are disclosed wherein the dielectric strength of at least one gas in each mixture increases at less than a linear rate with increasing pressure and the mixture gases are present in such proportions that the sum of their electrical discharge voltages at their respective partial pressures exceeds the electrical discharge voltage of each individual gas at the same temperature and pressure as that of the mixture. 1 claim. (ERA citation 05:028935)

PATENT-4 169 283
Not available NTIS
Department of Energy, Washington, DC.
Step-Control of Electromechanical Systems.
Patent,
R. N. Lewis. Filed 4 Apr 77, patented 25 Sep 79, 22p PAT-APPL-784 400
Supersedes PAT-APPL-784 400-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The response of an automatic control system to a general input signal is improved by applying a test input signal and determining correctional constants necessary to provide a modified input signal to be added to the input to the system. A method is disclosed for determining correctional constants. The modified input signal, when applied in conjunction with an operating signal, provides a total system output exhibiting an improved response. This method is applicable to open-loop or closed-loop control systems. The method is also applicable to unstable systems, thus allowing controlled shut-down before dangerous or destructive response is achieved and to systems whose characteristics vary with time, thus resulting in improved adaptive systems. 15 claims. (ERA citation 05:029492)

PATENT-4 174 145
Not available NTIS
Department of Energy, Washington, DC.
High Pressure Electrical Insulated Feed Thru Connector.
Patent,
J. E. Oeschger, and J. E. Berkeland. Filed 29 Dec 76, patented 13 Nov 79, 8p PAT-APPL-755 510
Supersedes PAT-APPL-755 510-76.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A feed-thru type hermetic electrical connector is presented including at least one connector pin feeding through an insulator block within the metallic body of the connector shell. A compression stop arrangement coaxially disposed about the insulator body is brazed to the shell, and the shoulder on the insulator block bears against this top in a compression mode, the high pressure or internal connector being at the opposite end of the shell. Seals between the pin and an internal bore at the high pressure end of the insulator block and between the insulator block and the metallic shell at the high pressure end are hermetically brazed in place, the first of these also functioning to transfer the axial compressive load without permitting appreciable shear action between the pin and insulator block. 11 claims. (ERA citation 05:029491)

PATENT-4 174 510
Not available NTIS
Department of Energy, Washington, DC.
Rf Transformer.
Patent,
J. L. Smith, H. W. Helenberg, and D. J. Kilsdonk. Filed 28 Dec 77, patented 13 Nov 79, 6p PAT-APPL-865 162
Supersedes PAT-APPL-865 162-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

There is provided an improved rf transformer having a single-turn secondary of cylindrical shape and a coiled encapsulated primary contained within the secondary. The coil is tapered so that the narrowest separation between the primary and the secondary is at one end of the coil. The encapsulated primary is removable from the secondary so that a variety of different capacity primaries can be utilized with one secondary. 7 claims. (ERA citation 05:029490)

PATENT-4 175 048
Not available NTIS
Department of Energy, Washington, DC.
Gaseous Insulators for High Voltage Electrical Equipment.
Patent,
L. G. Christophorou, D. R. James, M. O. Pace, and R. Y. Pai. Filed 6 Sep 77, patented 20 Nov 79, 12p PAT-APPL-830 973
Supersedes PAT-APPL-830 973-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Gaseous insulators comprise compounds having high attachment cross sections for electrons having energies in the 0 to 1.3 electron volt range. Multi-component gaseous insulators comprise compounds and mixtures having overall high electron attachment cross sections in the 0 to 1.3 electron volt range and moderating gases having high cross sections for inelastic interactions with electrons of energies 1 to 4 electron volts. Suitable electron attachment components include hexafluorobutyne, perfluorobutene-2, perfluorocyclobutane, perfluorodimethylcyclobutane, perfluorocyclohexene, perfluoromethylcyclohexane, hexafluorobutadiene, perfluoroheptene-1 and hexafluoroazomethane. Suitable moderating gases include N sub 2 , CO, CO sub 2 , and H sub 2 . The gaseous insulating mixture can also contain SF sub 6 , perfluoropropane and perfluorobenzene. 11 claims. (ERA citation 05:029489)

PATENT-4 189 660
Not available NTIS
Department of Energy, Washington, DC.
Electron Beam Collector for a Microwave Power Tube.
Patent,
R. A. Dandl. Filed 16 Nov 78, patented 19 Feb 80, 4p PAT-APPL-961 175
Supersedes PAT-APPL-961 175-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a cylindrical, electron beam collector that efficiently couples the microwave energy out of a high power microwave source while stopping the attendant electron beam. The interior end walls of the collector are a pair of facing parabolic mirrors and the microwave energy from an imput horn is radiated between the two mirrors and reassembled at the entrance to the output waveguide where the transmitted mode is reconstructed. The mode transmission through the collector of the present invention has an efficiency of at least 94%. 2 claims. (ERA citation 05:029562)

PB80-205073 Not available NTIS
National Bureau of Standards, Washington, DC.
Porous Polymer Tape Screening Program.
Final rept.,
A. J. Bur. 1979, 47p
Prepared in cooperation with Electric Power Research Institute, Washington, DC.
Pub. in EL-1259, 47p (Electric Power Research Institute, Palo Alto, CA 1979).

A screening program has been developed for porous polymer tapes which are considered to be candidates for a tape-oil insulation system in a high-voltage transmission cable. The program consists of 21 tests for measuring mechanical, electrical and physical properties. Descriptions of most of these tests have been published in ASTM test schedules or in other literature sources. Two of the tests had to be developed in our laboratories. They are the degree-of-void-filling test and the solubility test.

SAND-79-1075 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Theory of Small Helical Magnetic Flux Compression Amplifiers.
O. M. Stuetzer. Sep 79, 29p
Contract EY-76-C-04-0789

A linear theory is presented of closely wound, helical, magnetic flux compression transducers; the theory is based on an equivalent circuit model. Load inductance, load resistance, and eight basic materials and design parameters are taken into account; capacitances are neglected. It was necessary to introduce two parameters which are not well understood, but it can be proven that varying them causes only minor changes in the results. The primary conclusion reached is that device performance is limited by both flux loss and flux remaining in the generator after compression. (ERA citation 05:002348)

SAND-79-1487 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
High-Temperature Complementary Metal Oxide Semiconductors (CMOS).
J. D. McBrayer. Oct 79, 58p
Contract EY-76-C-04-0789

Silicon CMOS devices were studied, tested, and evaluated at high temperatures to determine processing, geometric, operating characteristics, and stability parameters. After more than 1000 hours at 300 exp 0 C, most devices showed good stability, reliability, and operating characteristics. Processing and geometric parameters were evaluated and optimization steps discussed. (ERA citation 05:004837)

SAND-79-2218A PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Behavior of Silicon Devices at High Temperatures.
B. L. Draper. 1979, 7p
Contract EY-76-C-04-0789

Computer modelling, device redesign, and better fabrication techniques show that silicon MOSFets and Harris semiconductors may be used in downhole instrumentation for temperatures in excess of 300 exp 0 C. Performance limits for silicon devices are given. (ERA citation 05:009030)

UCID-18622 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Noise Characterization of the Linear CCD.
C. F. McConaghy. May 80, 21p
Contract W-7405-ENG-48

Work in evaluating the noise performance of the linear charge-coupled devices (CCD) is summarized. The noise determines the minimum amplitude signal the CCD is capable of capturing and therefore is one of the prime parameters in determining dynamic range. The noise after correlated double sampling and correction of some ground loops will be shown equivalent to 150 rms electrons at the floating diffusion sensor on the CCD. (ERA citation 05:024572)

UCRL-83307 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Detection of a Normal Zone in Inductively Coupled Superconducting Coils.
E. W. Owen. Nov 79, 23p CONF-791102-3
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A method is described for the electrical detection of a normal zone in inductively coupled superconducting coils. Measurements are made with two kinds of bridges, mutual inductance bridges and self-inductance bridges. The bridge outputs are combined with other measured voltages to form a detector that can be realized with either analog circuits or a computer algorithm. The detection of a normal zone in a pair of coupled coils, each with taps, is discussed in detail. The method also applies to a pair of coils when one has no taps and to a pair when one coil is superconducting and the other is not. The method can be extended, in principle, to a number of coils. A description is given of a technique for balancing the bridges at near the operating currents of the coils. (ERA citation 05:003487)

9B. Computers

AD-A086 290/4 PC **A06**/MF **A01**
Northwestern Univ Evanston IL Dept of Electrical Engineering and Computer Science
Self-Metric Software. Volume I. Summary of Technical Progress.
Final technical rept. 1 Aug 76-15 Jan 80,
Stephen S. Yau. Apr 80, 110p RADC-TR-80-138-VOL-1
Contract F30602-76-C-0397
See also Volume 2, Part 1, AD-A086 291.

This report documents the research performed under RADC Contract by Northwestern University in the area of developing effective techniques for large-scale software maintenance, including those for the design, implementation, validation, and evaluation of reliable and maintainable software systems with a high degree of automation. During this contract period, research in the areas of ripple effect analysis, testing during software maintenance, specification for program modifications, quality factors for software maintainability, and dynamic monitoring of program behavior was conducted. In this report, the software maintenance process is first described. The research results which have been presented in previous papers and interim technical reports are summarized, and unfinished work is presented.

AD-A086 291/2 PC **A03**/MF **A01**
Northwestern Univ Evanston IL Dept of Electrical Engineering and Computer Science
Self-Metric Software. Volume II. A Handbook. Part I. Logical Rippie Effect Analysis.
Final technical rept. Aug 76-Jan 80,
Stephen S. Yau, James S. Collofello, and Chung-Chu Hsieh. Apr 80, 40p RADC-TR-80-138-VOL-2
Contract F30602-76-C-0397
See also Voume 3, Part 2, AD-A086 292.

This handbook consists of two parts on ripple effect analysis for large-scale software maintenance. In part I, a ripple effect analysis technique for software maintenance from the logical or functional perspective is presented. In a separate volume, the Part II of the handbook, a ripple effect analysis technique for software maintenance from the performance perspective is presented. The purpose of this handbook is to present ripple effect analysis techniques to assist software maintenance personnel to do a better job in large-scale software maintenance. The material presented in this handbook is organized in three levels. At the first level, the software maintenance process is described and the need for effective rippie effect and techniques for large-scale software maintenance is given. The capabilities and restrictions of the logical ripple effect analysis technique, as well as how this technique is interfaced with the user, are presented. At the second level, the logical rippie effect analysis technique is outlined in two phases: the lexical analysis phase and the tracing phase. At the third level, the steps of the logical rippie effect analysis technique are given in detail. However, the detailed theory behind this technique is not presented in ths handbook, but contained in other reports. (Author)

AD-A086 292/0 PC **A03**/MF **A01**
Northwestern Univ Evanston IL Dept of Electrical Engineering and Computer Science
Self-Metric Software. Volume III. A Handbook. Part II. Performance Ripple Effect Analysis.
Final technical rept. Aug 76-Jan 80,
Stephen S. Yau, and James S. Collofello. Apr 80, 47p RADC-TR-80-138-VOL-3
Contract F30602-76-C-0397
See also Part 1, AS-A086 291.

In this volume, the Part II of the handbook, a ripple effect analysis technique for software maintenance from the performance perspective is presented. The purpose of this handbook is to present ripple effect analysis techniques to assist software maintenance personnel to do a better job in large-scale software maintenance. The material presented in this handbook is organized in three levels. At the first level, the software maintenance process is described and the need for effective ripple effect analysis techniques for large-scale software maintenance is given. The capabilities and restrictions of the performance ripple effect analysis technique, as well as how this technique is interfaced with the user, are presented. At the second level, the performance ripple effect analysis technique is outlined in two phases: the lexical analysis phase and the tracing phase. At the third level, the steps of the performance ripple effect analysis technique is not presented in this handbook, but contained in other reports. Finally, the integration of the processing steps of the performance ripple effect analysis and the logical ripple effect analysis is discussed.

AD-A086 329/0 PC **A03**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
A Study of Landsat Multi-Spectral Scanner Data Tapes.
Technical rept.,
A. H. Benny. Feb 80, 38p RAE-TR-80018, DRIC-BR-73767

A detailed study is described of a number of computer compatible magnetic tapes containing Landsat multi-spectral scanner (MSS) data. This study reveals the differences between raw and corrected data tapes and indicates how the conversion is performed. It also shows the differences between the existing and a new form of corrected data tape. From the knowledge gained, a computer program has been written, to enable raw data, desirable for certain computer analyses, to be obtained from the existing stocks of corrected data tapes. (Author)

AD-A086 334/0 PC **A07**/MF **A01**
IBM Federal Systems Div Gaithersburg MD
Analysis of Discrete Software Reliability Models.
Final technical rept. Oct 78-Sep 79,
W. D. Brooks, and R. W. Motley. Apr 80, 144p RADC-TR-80-84
Contract F30602-78-C-0346

Discrete (binomial and Poisson) software reliability models, previously developed by IBM, are presented. They were examined for their validity using historical data provided by RADC from seven development projects. Simulated error data that closely agreed with the model assumptions were also used for validation. The results indicated that the models provide reasonable fits to the historical error data.

AD-A086 338/1 PC **A13**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA

ARPANET Routing Algorithm Improvements.
Semiannual technical rept. no. 2, 18 Apr-15 Oct 78,
J. M. McQuillan, I. Richer, E. C. Rosen, and D. P. Bertsekas. Oct 78, 278p Rept no. BBN-3940
Contract MDA903-78-C-0129, ARPA Order-3491
See also report dated Mar 79, AD-A086 340.

This report describes progress during the second six months of a contract to make several improvements to ARPANET routing. A new line up/down protocol has been designed and implemented, and its performance has been extensively measured under actual network conditions. The protocol is described and the measurements are presented. Software routines to measure and report average packet delays on a per-hop basis have been designed and implemented. The routines are described, and measurements which have been performed using the routines are presented. A rigorous mathematical analysis of the stability of the SPF algorithm is presented. A protocol to ensure the rapid and reliable transmission of routing update message has been designed. It is described, and the reasons for choosing it are discussed. A preliminary design of enhanced message capabilities for the ARPANET (logical addressing, broadcast addressing, and group addressing) is presented. Finally, the interactions between routing and congestion control are discussed. (Author)

AD-A086 339/9 PC **A09**/MF **A01**
University of Southern California Los Angeles Image Processing Inst
Image Understanding Research.
Semiannual technical rept. 1 Oct 79-31 Mar 80,
Ramakant Nevatia, and Alexander A. Sawchuk. 31 Mar 80, 184p Rept no. USCIPI-960
Contract F33615-76-C-1203, DARPA Order-3119

This technical report summarizes the image understanding and smart sensor and VLSI hardware research activities performed by the USC Image Processing Institute and the Hughes Research Laboratories during the period of 1 October 1979 through 31 March 1980 under contract with the Defense Advanced Research Projects Agency, Information Processing Techniques Office, and monitored by the Wright-Patterson Air Force Base, Dayton, Ohio. The research program has, as its primary purpose, the development of techniques and systems for understanding images. Methodologies range from low level image processing principles, smart sensor CCD LSI and VLSI circuit design, up to higher level symbolic representations and relational structure manipulations.

AD-A086 340/7 PC **A08**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
ARPANET Routing Algorithm Improvements.
Semiannual technical rept. no. 3, 1 Oct 78-1 Apr 79,
E. C. Rosen, J. M. McQuillan, J. G. Herman, and I. Richer. Apr 79, 171p Rept no. BBN-4088
Contract MDA903-78-C-0129, ARPA Order-3491
See also report dated Oct 78, AD-A086 338.

This report describes progress made during the third six months of a contract to make several improvements to ARPANET routing. During this period all aspects of the ARPANET's new routing algorithm were implemented and the new algorithm was run through an extensive series of tests. The results of these tests are presented, along with a discussion of our testing goals, techniques, and tools. A full description of the procedures needed to handle a dynamically changing topological data base is also presented. Measurements on the performance of the ARPANET's new line up/down protocol are presented. Lastly, the procedures used in the ARPANET for managing buffer space are described. (Author)

AD-A086 354/8 MF **A01**
Air Force Aero Propulsion Lab Wright-Patterson AFB OH
GRAPH-An Interactive Computer Program used for Technical Plotting.
Final rept. 1 Jul 77-1 Aug 78,
Sandra K. Drake. Apr 80, 101p Rept no. AFAPL-TR-78-90
Supersedes report dated Nov 78, AD-A068 668.
Availabiliy: Microfiche copies only.

This technical report describes a computer program 'graph' which supplies a capability to do efficient plotting of all types of analytical data in a manner suitable for direct substitution into technical papers and articles. DISPLA, a prepackaged sit of subroutines from Integrated Software systems Corporation was used in creation of 'graph'. Input is designed for the TEK4010 on-line computer terminal. Style and format of the created plot is specified by the user through interactive questions and answers. Options include special alphabets, curve fitting procedures, axis labeling and scaling, and the use of multi-curves. (Author)

AD-A086 359/7 MF **A01**
Stanford Univ CA Dept of Computer Science
The Computer Modern Family of Typefaces.
Technical rept.,
Donald E. Knuth. Jan 80, 207p Rept no. STAN-CS-80-780
Contract N00014-76-C-0330
Availability: Microfiche copies only.

This report gives machine-independent definitions of all the styles of type planned for use in future editions of The Art of Computer Programming. Its main purpose is to provide a detailed example of a complete family of font definitions using METAFONT, so that people who want new symbols for their own books and papers will understand how to incorporate them easily. The fonts are intended to have the same spirit as those used in earlier editions of The Art of Computer Programming, but each character has been redesigned and defined in the METAFONT idiom. It is hoped that some readers will be inspired to make similar definitions of other important families of fonts. The bulk of this report consists of about 400 short METAFONT programs for the various symbols needed, and as such it is pretty boring, but there are some nice illustrations. (Author)

AD-A086 374/6 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Design Considerations for Data-Flow Database Machines.
Technical summary rept.,
Haran Boral, and David J. DeWitt. Mar 80, 36p Rept no. MRC-TSR-2058
Contracts DAAG29-79-C-0165, DAAG29-75-C-0024
Sponsored in part by grant NSF-MCS78-01721.

This paper presents a discussion of the application of data-flow machine concepts to the design and implementation of database machines which execute relational algebra queries. We analyze the performance of multiprocessor nested-loops and sort-merge join algorithms and show that the nested-loops algorithm is generally superior. Three levels of operand granularity for data-flow database machines are introduced and compared using the nested-loops join algorithm. We demonstrate that relation-level granularity is too coarse and that tuple-level granularity is too fine. The third level of granularity, a page of a relation, is shown to be the best choice from both hardware and software viewpoints. Finally a preliminary design for a data-flow database machine which utilizes page-level granularity and supports distributed control of instruction execution is presented. (Author)

AD-A086 444/7 PC **A08**/MF **A01**
Doty Associates Inc Rockville MD
Handbook of Procedures for Estimating Computer System Sizing and Timing Parameters. Volume I. Procedures and Techniques.
Final technical rept. 16 May 79-15 Feb 80,
William B. Humphrey, and John N. Postak. 15 Feb 80, 153p DAI-TR-235-VOL-1, ESD-TR-80-115-VOL-1
Contract F19628-79-C-0106
See also Volume 2, AD-A086 140.

This first volume of the handbook presents procedures that provide a structured approach for estimating computer system sizing and timing parameters during the acquisition life-cycle of Embedded Computer Systems (ECS). The procedures were designed for use by the Electronic Systems Division's Computer Systems Engineering Directorate (ESD/TOI). Based on engineering discipline, the procedures provide a step-by-step program to assist ESD/TOI engineers and computer scientists in evaluating or conducting initial sizing and timing estimates, updates, or developmental monitoring. Procedural steps are discussed with emphasis on actions that should be taken, risks that should be considered, constraints that may be encountered, and factors that may affect the quality of the estimate at various stages of the acquisition. Techniques that can be used in estimating sizing and timing parameters are also discussed, including data requirements, assumptions, and levels of confidence. In addition, this volume also contains a reference listing, bibliography, glossary, and an index.

AD-A086 487/6 PC **A05**/MF **A01**
Weapons Systems Research Lab Adelaide (Australia)
Discrete/Continuous Simulation Language.
Technical rept.,
T. J. Packer, J. R. Coleby, and T. J. Galvin. Jun 79, 94p Rept no. WSRL-0104-TR

This report takes the form of a user guide for the Discrete/Continuous simulation Language (DCSL). This language has been developed to allow the convenient setting-up of simulations based directly upon models formulated in a graphical modelling language referred to here as GML. The DCSL System Program is written in FORTRAN and hence DCSL is easily implemented on most modern machines. (Author)

AD-A086 490/0 PC **A08**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
Navy Embedded Computer Accreditation Program.
Final technical rept.,
Billy B. Wise. Apr 80, 159p Rept no. GIT/EES-A-2486
Contract N00014-79-C-0722

The Navy Embedded Computer Accreditation Program is the examination of the viability and strategy appropriate to a new, more nearly 'optimal' acquisition policy for embedded computers. Under accreditation, the Navy would approve (accredit) a controlled number of computers for use by project managers as the computers become available and meet certain qualification criteria relating to life cycle cost, performance and logistic supportability. This report addresses the issues and establishes a tentative set of accreditation criteria which provide a means for the Navy to move smoothly from the current policy of standardization on a single computer in a performance range to the accreditation policy. (Author)

AD-A086 499/1 PC **A05**/MF **A01**
Naval Surface Weapons Center Dahlgren VA
Computer Programming and Coding Standards for the FORTRAN AND SIMSCRIPT II.5 Programming Languages.
Final rept.,
Robert T. Bevan, and John H. Reynolds. Apr 80, 77p Rept no. NSWC/TR-3878

Contemporary studies of the software development process have shown definitively that an 'ad-hoc' attempt at developing large and complex programming systems yields software that is too expensive, too difficult to maintain, inefficient, and, often, incorrect. Worse, it is very difficult to assure oneself that it is correct. This report deals with standards that make the development of programs a more precise process. This does not mean to imply that use of a rigorous set of programming standards is a panacea for computer programming. On the contrary, use of standards merely reduces the number of errors introduced. Using standards such as those documented in this report will be seen to require more effort on the part of the programming staff than heretofore. This effort is not in vain, however, since the additional effort consists of tasks that were simply not done in the approaches of the past. Additionally, standards greatly improve the reliability, maintainability, and transportability of the resultant programs.

AD-A086 504/8 PC **A07**/MF **A01**
Stanford Univ CA Dept of Computer Science
Building Program Models Incrementally from Informal Descriptions.
Technical rept.,
Brian Perry McCune. Oct 79, 144p Rept nos. STAN-CS-79-772, AIM-333

Contract MDA903-76-C-0206
Prepared in cooperation with Systems Control, Inc., Palo Alto, CA. Dept. of Computer Science, Contract N00014-79-C-0127, Rept. no. SCI-ICS-U79-2.

Program acquisition is the transformation of a program specification into an executable, but not necessarily efficient, program that meets the given specification. This thesis presents a solution to one aspect of the program acquisition problem; the incremental construction of program models from informal descriptions. The key to the solution is a framework for incremental program acquisition that includes a formal language for expressing program fragments that contain informalities; a control structure for the incremental recognition and assimilation of such fragments; and a knowledge base of rules for acquiring programs specified with informalities. The thesis describes a LISP based computer system called the Program Model Builder (PMB), which receives informal program fragments incrementally and assembles them into a very high level program model that is complete, semantically consistent, unambiguous, and executable. The program specification comes in the form of partial program fragments that arrive in any order and may exhibit such informalities as inconsistencies and ambiguous references. Possible sources of fragments are a natural language parser or a parser for a surface form of the fragments. PMB produces a program model that is a complete and executable computer program. the program fragment language used for specifications is a superset of the language in which program models are built. This program modelling language is a very high level programming language for symbolic processing that deals with such information structures as sets and mappings. The recognition paradigm used by PMB is a form of subgoaling that allows the parts of the program to be specified in an order chosen by the user, rather than dictated by the system.

AD-A086 509/7 PC **A04**/MF **A01**
Yale Univ New Haven CT Dept of Computer Science
A Survey of Synchronization Problems.
Technical rept.,
George Holober. Sep 80, 55p Rept no. TR-181/80
Contract N00014-75-C-0752

Decreased hardware costs will facilitate the use of parallel computation in the near future. Synchronization primitives will be needed to implement concurrent algorithms. Many such primitives have been proposed to date. Unfortunately, their power can only be accurately measured in terms of their ability to solve a particular set of synchronization problems. A correspondingly large number of such problems have been proposed along with the primitives. We present some of these synchronization problems and outline their parameters, variations, and histories. (Author)

AD-A086 513/9 PC **A04**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Image Understanding Using Overlays.
Final rept. 1 Apr 78-31 May 80,
Azriel Rosenfeld. 31 May 80, 65p
Contract DAAG53-76-C-0138, DARPA Order-3206

This project is concerned with the study of advanced techniques for the analysis of reconnaissance imagery. The current project is concerned with the development and application of advanced techniques for image processing, feature detection, segmentation, texture and shape analysis, and region representation. (The overlays in the project title refer to region representations which specify background areas or possible object locations.)

AD-A086 554/3 PC **A03**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
Objective Quality Control of Artillery Computer Meteorological Messages.
Technical rept.,
Ernest B. Stenmark. Apr 80, 44p Rept no. ERADCOM/ASL-TR-0055

Artillery computer meteorological (CM) messages are susceptible to having errors introduced into them during preparation at the Meteorological Section, during transmission to the user unit, and during entry into the Fire Direction Center computer. Quality control during preparation of the CM message is largely a manual function and thus subject to human error. At the Fire Direction Center, in the case of the most advanced computerized tactical fire direction control system, TACFIRE, quality control of the CM message is limited to superficial automated checks that relate primarily to message format, not content, and to reliance upon visual screening by the TACFIRE operator before acceptance, storage, and usage of the message. No quality control checks of the contents of the message are made during movement of the CM message from the preparer to the user. This report documents the development of procedures for objectively performing meteorologically consistent quality control checks on the contents of single CM messages that would require only very limited automatic data processing resources to implement at either the preparer or user end, or both, and that would improve upon the validity checks currently implemented in the TACFIRE system. (Author)

AD-A086 571/7 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
The Utilization of Requirement Statement Methodologies in the United States Navy and Their Impact on Systems Acquisition.
Master's thesis,
Frederic Andrew Petrie, III. Mar 80, 123p

The success or failure of weapons systems software projects can often be traced back to the project's definition phase. There currently exists in the literature many articles dealing with the problems inherent in the development of requirements specifications. This thesis reviews some of the problems and examines an evolving, disciplined method to better state the user's requirements, called Requirement Statement Languages (RSL). Two automated systems utilizing RSL, SREM and PSL/PSA, are reviewed as to their strengths and weaknesses in system definition and development, particularly as they are currently used in the Navy. Also discussed are how these systems may be utilized in the Navy system acquisition process and recommendations are made as to how the Navy can incorporate such software technology. (Author)

AD-A086 574/1 PC **A02**/MF **A01**
Stanford Univ CA Dept of Computer Science
Circumscription - A Form of Non-Monotonic Reasoning.
Technical rept.,
John McCarthy. Feb 80, 18p Rept nos. STAN-CS-80-788, AIM-334
Contract MDA903-76-C-0206, ARPA Order-2494

Humans and intelligent computer programs must often jump to the conclusion that the objects they can determine to have certain properties or relations are the only objects that do. Circumscription formalizes such conjectural reasoning. (Author)

AD-A086 577/4 PC **A02**/MF **A01**
Stanford Univ CA Dept of Computer Science
ADA Exceptions: Specification and Proof Techniques.
Technical rept.,
D. C. Luckham, and W. Polak. Feb 80, 21p Rept nos. STAN-CS-80-789, PVG-16
Contracts MDA903-80-C-0159, F30602-80-C-0022

A method of documenting exception propagation and handling in Ada programs is proposed. Exception propagation declarations are introduced as a new component of Ada specifications. This permits documentation of those exceptions that can be propagated by a subprogram. Exception handlers are documented by entry assertions. Axioms and proof rules for Ada exceptions are given. These rules are simple extensions of previous rules for Pascal and define an axiomatic semantics of Ada exceptions. As a result, Ada programs specified according to the method can be analysed by formal proof techniques for consistency with their specifications, even if they employ exception propagation and handling to achieve required results (i.e. non error situations). Example verifications are given. (Author)

AD-A086 606/1 PC **A03**/MF **A01**
ORINCON Corp La Jolla CA
Data Association Algorithms for Large Area Surveillance,
Charles L. Morefield, and Christian M. Petersen. 1978, 49p
Contract N00014-77-C-0296
Presented at ORSA/TIMS Meeting, May 78.

This paper is devoted exclusively to automatic (i.e., computer) algorithms for carrying out the tasks associated with intersensor correlation. One particular algorithm (the 'k-track clustering' algorithm is discussed in some detail in order to highlight the fundamental combinatorial structure of large area surveillance.

AD-A086 656/6 PC **A03**/MF **A01**
Louisiana State Univ Baton Rouge Dept of Electrical Engineering
A Study of Texture Analysis Algorithms.
Annual rept.,
Charles A. Harlow, and Richard W. Conners. 23 Apr 80, 27p AFOSR-TR-80-0505
Contract F49620-79-C-0042

This research has focused upon evaluating and developing texture analysis algorithms. During the current year theory has been developed for evaluating texture analysis algorithms. It has been shown that the Spatial Gray Level Dependence algorithm is a superior algorithm under fairly weak assumptions. The assumption required is that the textures be translation stationary random fields of order two. Under these assumptions, the SGLDM algorithm is superior to the Power Spectral Method, the Gray Level Run Length Method and the Gray Level Difference Method. The SGLDM algorithm has therefore been the focus of our subsequent work. Efforts have progressed on developing a combined structural and statistical texture analysis algorithm. Methods have been developed for characterizing the unit cell which gives the basic repeated texture pattern. Combined with a study of the unit cell has been the development of a mosaic model for textures that utilizes tiling theory. Tiling theory provides the basic mathematical structure required for analysis. (Author)

AD-A086 690/5 PC **A06**/MF **A01**
California Univ Berkeley Electronics Research Lab
The Design Methodology of Distributed Computer Systems.
Final technical rept. 1 Jul 78-30 Jun 79,
C. V. Ramamoorthy. May 80, 101p AFOSR-TR-80-0542
Grant AFOSR-78-3630

Performance evaluation techniques for asynchronous concurrent systems is developed using the Petri net approach. Analysis techniques for deadlocks in asynchronous concurrent systems is also explored. Moreover, a need for adaptive reconfiguration techniques is established along with necessary and sufficient conditions for reconfigurability. Then a method is described for evaluating the available reconfiguration strategies based on a figure of merit is described.

AD-A086 711/9 MF **A01**
Delaware Univ Newark Applied Mathematics Inst
Algorithmic Analysis of a Markovian Model for a System with Batch and Interactive Jobs.
Interim rept.,
Jean Paul Colard, and Guy Latouche. Mar 80, 34p TR-52B, AFOSR-TR-80-0500
Grants AFOSR-77-3236, NSF-ENG79-08351
Availability: Microfiche copies only.

A computer system serving both batch and interactive jobs is modeled as a single server queue, with an infinite source of ordinary customers and a finite source of priority customers. The stability condition and the stationary probability distribution are determined. For a stable system, it is shown how the distribution and moments, of the waiting time, the sojourn time, the completion time, and the busy period, may be efficiently computed. (Author)

AD-A086 758/0 PC **A02**/MF **A01**
Southern Methodist Univ Dallas TX
Random Process Generation.
Final rept. 1 Jun 77-30 Sep 79,

Bruce W. Schmeiser. Jun 80, 13p
Contract N00014-77-C-0425

'Random process generation' includes all aspects of modeling and generating (pseudo) random variates for driving probabilistic simulations on digital computers. Topics include the selection of appropriate statistical distributions, parameter determination, diagnostic checking, and generation of random variables. The research performed under the auspices of this contract emphasized the use of general four-parameter families of distribution during the first year. The second year concentrated on generation of random vectors from multivariate distributions. Several other topics were considered as well. A brief summary of the principal investigator's thoughts on the future of random process generation concludes the report.

AD-A086 766/3 PC **A06**/MF **A01**
LN K Corp Silver Spring MD
Pattern Recognition Investigation and Analysis of Planar Point Patterns.
Final rept.,
David Lavine, Barbara Lambird, and Laveen N. Kanal. 1979, 112p
Contract DAAK70-79-C-0091

Two basic types of planar point patterns were investigated. The first is specified by a set of points in a plane and a noise model which determines the allowed perturbations of the points subject only to the restriction that no interpoint distance should change by more than a certain percentage. The second type is specified by a set of points subject to angle and distance constraints. Representations of point patterns having some invariance properties are presented. For the first type of prototype patterns, these include SIDV's ((Sorted Interpoint Distance Vectors), SSN's (Sorted Nearest Neighbor Vectors), and MST'S (Minimal Spanning Trees). Theorems, experimental results of simulations, advantages, disadvantages and comparisons are presented for classification precedures based on these representations. It is concluded that classification of the first type of patterns can be accomplished using the methods based on SIDV's, SNN's and MST's under certain restrictions. If the number of points in the pattern is small, less than 100, then the SIDV method would be better, while more than 100, then the SNN or methods based on MST's would be more useful. If the percentage of additions or deletions of points is small, of the order of 10%, then the SDV, SNN, and MST are still feasible. If the percentage is large, then other methods must be used.

AD-A086 769/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Short Space Implementation of Wiener Filtering for Image Restoration.
Technical note,
Jae S. Lim. 5 Mar 80, 17p TN-1980-11, ESD-TR-80-17
Contract F19628-80-C-0002

In this report, short space implementation of image restoration systems such as Wiener filtering to avoid the image non-stationarity problem is discussed. It is demonstrated by way of examples that short space implementation leads to a significant performance improvement in reducing wideband random noise relative to the traditional approach in which the entire image is processed by a linear space invariant filter. (Author)

AD-A086 832/3 PC **A02**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
TCP for the HP 3000.
Quarterly technical rept. 15 Dec 79-30 Apr 80,
R. D. Bressler. May 80, 16p Rept no. BBN-4458
Contract MDA904-80-C-0214, ARPA Order-3214

This Quarterly Technical Report covers one phase of an ongoing research effort to implement TCP protocols on an HP3000 computer system. (Author)

AD-A086 865/3 PC **A02**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Fast Language Acceptance by Shrinking Cellular Automata,
Azriel Rosenfeld, Angela Y. Wu, and Tsvi Dubitzki. Apr 80, 14p TR-898, AFOSR-TR-80-0538
Grant AFOSR-77-3271

When bounded cellular automata are used as acceptors for formal languages, the number of time steps required to accept a string sigma is at least true value of sigma, except in certain trivial cases, since the distinguished cell's state after t steps cannot depend on the initial states of the cells at distances > t from it. However, if the automaton is allowed to shrink (i.e., cells are deleted, and their predecessors become directly connected to their successors), language acceptance in less than linear time becomes possible. (Author)

AD-A086 867/9 PC **A02**/MF **A01**
Maryland Univ College Park Dept of Computer Science
'Real-World' Properties in the Requirements for Embedded Systems,
Pamela Zave. 1979, 17p
Contract N00014-77-C-0623

This paper addresses a central issue in the specification of requirements for embedded systems: How can the ragged and open-ended properties of the 'real world' be usefully included in a coherent, closed requirements specification. Certainly the term 'embedded system' is closely associated with the physical properties of computing environments, such as time and hardware reliability. Section 2 argues that emphasis on real-world, or physical, properties defines embedded systems, so that the role of these properties in requirements specification for embedded systems is indeed central. Section 3 sketches an approach to the requirements problem which should be well suited to the inclusion of physical attributes, but explains that a nagging problem remains. Section 4 presents a trial solution to this problem.

E80-10148 PC **A03**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Label Identification from Statistical Tabulation (LIST) Temporal Extendability Study.
Technical rept.,
T. B. Dennis. Feb 80, 39p LEMSCO-14278, NASA-CR-160563, JSC-16334
Contract NAS9-15800
Sponsored in part by Department of Agriculture, Washington, DC., Department of Commerce, Washington, DC., and Department of the Interior, Washington, DC. Report on AgRISTARS.

The author has identified the following significant results. The most apparent contributors to the problem of poor temporal extension of LIST are the drastic changes in the brightness keys and an inadequate set of A1 responses in Phase 3. The brightness trajectories change drastically from Phase 3 to the transition year (TY). Removing brightness channels from the discriminant does not completely correct the lack of extendability. Removing brightness increases the accuracy of the extension from Phase 3 to TY from 57.72% to 64.18%. The removal of the A1 keys increases accuracy to 65.76%. Although the latter increase appears insignificant when compared to the first, the removal of only the A1 keys increased accuracy to 63.58%. Proper weighting of the responses explains 73.8% of the ground truth labels but only 56.7% of the A1 labels. By contrast, the TY responses which were weighted to explain the TY ground truth labels faired equally well, explaining 73.6% of those labels and 87.1% of the A1 labels.

Juel-1596 PC **A05**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Sicherheitsforschung.
RAPS. A Threedimensional Plotprogram for Testing of the Model and for Plotting of the Results of Finite-Element Calculations.
D. Koschmieder, and J. Altes. Jun 79, 80p
In German.
U.S. Sales Only.

Usually in Finite-Element calculations a large amount of data is produced and because individual results have no meaning, graphic representation is bestsuited. It is convenient to link the F E Software-System with pre- and post-processors. The plotting system RAPS offers many possibilities for testing and description of two- or three-dimensional structures, as well as for interpretation of results of static and dynamic calculations. The program was developed for the F E System ASKA but it is possible to fit it to other F E Systems. At present the program is laid out for batch operation. However it is planned to develop an interactive version of RAPS and to enlarge the post-processor. (Atomindex citation 11:497529)

N80-28056/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Approach to Sounding on the VAS Processor.
D. Chesters. Mar 80, 23p NASA-TM-80713

The key features of the sounding software laboratory being installed on the VAS Processor at NASA/GSFC are outlined. Emphasis is on the support data and personal guidance that a meteorological researcher must provide to attune a physically modeled VAS sounding to his experiment. The fundamental aim of the sounding-support effort is to provide a system which makes use of: radiation transfer models based upon laboratory data, analytic inversion schemes, human guidance for quality control, statistically conditioned retrieval methods, and current ancillary data.

PB80-202476 PC **A06**/MF **A01**
Idaho Univ. Moscow. Dept. of Agricultural Engineering.
User's Guide to UIMIP and MTRX. Mixed Integer Linear Programming and Matrix Generating Program Packages.
Technical completion rept.,
Kyung Hak Yoo, and John R. Busch. May 80, 103p W80-06006, OWRT-B-041-IDA(1)
Prepared in cooperation with Idaho Water Resources Research Inst., Moscow.

A systematic discussion of the UIMIP integer linear programming program is presented in this user's manual. Users should have a basic knowledge of linear programming, mathematical programming, algorithms, and Fortran programming. Direct access files are used to reduce the computer memory size required for integer solutions and intermediate tableau and row and column identification tables are saved on a disk file during the integer solution. An integer programming problem as large as a continuous programming problem can be solved on a computer of a given size, but more CPU time is necessary for file assessment. A revised simplex method could cut down computing time and core size requirements. The organization of the program is described in detail and the four calling programs for subroutine (DEFINE FILE, DIMENSION, DOUBLE PRECISION, and DATA) are discussed. The data input formats, coding procedures and examples, and illustrations of a proper card deck are presented and guidelines for efficient use and error correction are included. A matrix generating program (MTRX) for UIMIP is available. Sample solutions for a small and a large sized problem are included.

PNL-SA-6895 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Distributed Data Analysis in a Mobile Real Time and Minicomputer Network Environment.
J. J. Thomas, G. A. Sandness, J. O. Schroeder, and A. J. Boland. 1978, 10p
Contract EY-76-C-06-1830

The system design and analysis processes involved in collecting data from a mobile laboratory to a finished analysis are presented. This involves real-time data collection on a small mobile cart, an intermediate analysis station in a nearby mobile van, and the final analysis performed through a minicomputer network of facilities. An iterative approach to data collection and review was established to provide timely analysis and verification of incoming data. This requires a highly interactive user-oriented environment in the field. After the data have been collected and preliminary analysis has been completed, the results can be integrated into a larger analysis system through a minicomputer network. This procedure also allows for utilization of high-cost equipment that cannot be placed in the field. A single hardware interface, BATNET (Battelle Network), is used to perform all data transfers via either radio (cart-to-van) or external network connections (van-to-computer network). The key software components described are a self-describing data base system utilizing

simple relational data base concepts, a simple command language allowing analysis and investigation in the field, and a simple preview system for intensity-modulated data. 2 figures. (ERA citation 05:010489)

SAND-78-1290 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Selected Algorithms for the Linearly Constrained Least Squares Problem: A User's Guide.
K. H. Haskell, and R. J. Hanson. Aug 79, 53p
Contract EY-76-C-04-0789

Reliable numerical methods for solving constrained least-squares problems are described. Linear least-squares problems with linear constraints are considered. The constraints may be equalities or inequalities. The form of the inequalities determines two problem classes that are discussed in the report: Problem LSEI has general inequality constraints, and Problem NNLSE has nonnegativity constraints. The first two sections of the report give selected mathematical and algorithmic details for transforming Problem LSEI to a form of Problem NNLSE. A further section deals with algorithmic details for solving Problem NNLSE. The last two sections give usage examples and instructions for two FORTRAN subprograms, LSEI ( ) and WNNLS ( ), that solve Problems LSEI and NNLSE, respectively. 2 figures. (ERA citation 05:002362)

SAND-79-0567C PC **A03**/MF **A01**
Scientific Simulation, Inc., Albuquerque, NM.
IOSYM: A Network Simulation Language for Continuous Systems.
J. Polito, and D. Smith. 1979, 28p CONF-791043-2
Contract EY-76-C-04-0789
TIMS/ORSA national meeting, Milwaukee, WI, USA, 15 Oct 1979.

IOSYM is a network language for simulating systems with many operations, each of which is a continuous process. Time events or crossing conditions may end operations. The network structure permits model construction to be specified by data input. IOSYM is a pre- and post-processor for the GASP IV language. 15 figures, 2 tables. (ERA citation 05:003945)

SLAC-PUB-2378 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Introduction to the Fastbus.
D. B. Gustavson. Aug 79, 8p CONF-790847-8
Contract EY-76-C-03-0515
International conference on high energy physics and nuclear structure, Vancouver, Canada, 13 Aug 1979.

The Fastbus is a modular data bus system for data acquisition and data processing. It is a multiprocessor system with multiple bus segments which operate independently but link together for passing data. It operates asynchronously to accommodate very high- and very low-speed devices over long or short paths, and uses handshake protocols for reliability. It can also operate synchronously without handshakes for transfer of data blocks at maximum speed. The goals, history, and motivation for the Fastbus are summarized briefly. The structure of the Fastbus system is described in general, and some details of its operation are introduced. (ERA citation 04:057079)

SLAC-PUB-2420 PC **A03**/MF **A01**
Stanford Linear Accelerator Center, CA.
Programmable Synchronous Communications Module.
D. Horelick. Oct 79, 31p CONF-791153-1
Contract EY-76-C-03-0515
Joint AT-E division seminar, Los Alamos, NM, USA, 14 Nov 1979.

The functional characteristics of a programmable, synchronous serial communications CAMAC module with buffering in block format are described. Both bit and byte oriented protocols can be handled in full duplex depending on the program implemented. The main elements of the module are a Signetics 2652 Multi-Protocol Communications Controller, a Zilog Z-808 8 bit microprocessor with PROM and RAM, and FIFOs for buffering. (ERA citation 05:009033)

SLAC-TN-79-7 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Bermuda Triangle: A Subsystem of the 168/E Interfacing Scheme Used by Group B at SLAC.
G. J. Oxoby, L. J. Levinson, and Q. H. Trang.
Dec 79, 22p
Contract EY-76-C-03-0515

The Bermuda Triangle system is a method of interfacing several 168/E microprocessors to a central system for control of the processors and overlaying their memories. The system is a three-way interface with I/O ports to a large buffer memory, a PDP11 Unibus and a bus to the 168/E processors. Data may be transferred bidirectionally between any two ports. Two Bermuda Triangles are used, one for the program memory and one for the data memory. The program buffer memory stores the overlay programs for the 168/E, and the data buffer memory, the incoming raw data, the data portion of the overlays, and the outgoing processed events. This buffering is necessary since the memories of 168/E microprocessors are small compared to the main program and the amount of data being processed. The link to the computer facility is via a Unibus to IBM channel interface. A PDP11/04 controls the data flow. 7 figures, 4 tables. (ERA citation 05:009556)

UCID-18272 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Zoom Transform as a Preprocessor for PARET.
W. D. Smith, and D. L. Lager. 18 Sep 79, 25p
Contract W-7405-ENG-48

The PARET algorithm for extracting mode or singularity parameters from a sampled record of transient experimental data has difficulty with data containing modes that are closely spaced in frequency relative to their absolute frequencies. It was felt that preprocessing the data with the so-called Zoom Transform might improve the performance of the PARET algorithm in such cases. This report describes a study carried out to determine the benefits of zooming to mode parameter estimation. The results suggest that zooming can greatly enhance the power of the PARET algorithm for certain types of data and should be implemented as a user option. 7 figures, 4 tables. (ERA citation 05:003950)

UCID-18295 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
QBUS/XBUS Interface Functional Outline.
J. C. Hill. 10 Oct 79, 10p
Contract W-7405-ENG-48

The QBUS/XBUS interface is a quad-size module that plugs into the LSI-11 QBUS and connects to the XBUS (extended bus) by means of 3M connectors at the back of the module. A catalog of the XBUS signals is given, and the two types of address mapping are explained. EAP window and I/O address assignments and the QBUS/XBUS interface block diagram are given. The principle interface functions are listed. 2 figures. (ERA citation 05:003951)

UCID-18329 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Interpolation and Data Fitting with Splines.
F. N. Fritsch. Nov 79, 30p
Contract W-7405-ENG-48

This is a report on the LLL Continuing Education Course CE1720, Interpolation and Data Fitting with Splines. This 21-lesson course was video-taped during Spring Quarter 1979, and was sponsored by Computation Department's Mathematics and Statistics Section. The following aspects of the course are treated: course description, course requirements, course structure, course outline and schedule, enrollment history, and software availability. 3 figures. (ERA citation 05:006400)

UCID-3011 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Octopus System User's Guide.
J. C. Collins. Apr 75, 41p
Contract W-7405-ENG-48

This document is a newcomer's guide to the LLL computer center, and explains how to submit a job and get it processed in the simplest possible way. The manual tells the user how to communicate with the system through the teletypewriter, and briefly describes some of the available compilers, text editors, utility routines, and computer graphics devices. 7 figures. (ERA citation 04:031986)

UCID-30166(Pt.2) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Graphics by Example, Part 2. PLOTPK: Plotting and Analyzing Data.
K. O'Hair. 30 May 78, 36p
Contract W-7405-ENG-48

PLOTPK provides a quick and easy way of plotting data and a flexible means of analyzing it. PLOTPK contains the tools one needs to create two- and three-dimensional graphs and to send them to a TMDS screen, RJET printer, or FR80-generated film. A scientist or engineer can use PLOTPK to scan a volume of data, looking for correlations between parameters and visually validating the data. 9 figures. (ERA citation 05:011020)

UCID-30166(Pt.7) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Graphics by Example, Part 7: The TV80LIB Graphics Library.
K. O'Hair. 15 Oct 79, 42p
Contract W-7405-ENG-48

TV80LIB is a FORTRAN library of graphics subroutines and device processors. TV80LIB routines are device-independent in that all picture-drawing calls are independent of the particular output device being used. This report, written for the new user, shows by example how to use TV80LIB with CHAT (the compiler for the LRLTRAN language). All libraries used (and the CHAT compiler as well) are available in public files on the CDC 7600 computers of the Livermore Octopus Network. The examples help to illustrate the use of decive processors, drawing routines, and color selection with TV80LIB in an LRLTRAN source program. 13 figures. (ERA citation 05:009557)

UCID-30172 PC **A09**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
GRAFLIB: Reference Manual.
P. Keller, K. O'Hair, and J. H. Rowe. 25 Oct 79, 192p
Contract W-7405-ENG-48

GRAFLIB is a library of graphics functions for use in FORTRAN programs. It is machine-independent, and all plotting functions are independent of the particular device that is active. Included in GRAFLIB are functions that do basic line-drawing, text plotting (in many fonts), curve plotting, two-dimensional shading, two-dimensional contouring, and many others. Any function written by a user that satisfies the GRAFLIB standard may also be added to the library. GRAFLIB level is directed to the typical graphics user. The aim of the GRAFLIB effort is to provide a comprehensive, integrated system of graphics subroutines for use in computer graphics. GRAFLIB is founded on the proposition that a graphics need arising in any kind of situation should be answerable with software tools appropriate to that situation. At its most fundamental level is a fast, small system of core routines (GRAFCORE), in which each routine performs a very elementary function. These routines may be used directly for the graphics in codes where efficiency is critical. All higher level GRAFLIB routines are built on top of GRAFCORE. At an intermediate level GRAFLIB provides an assortment of routines for needs that arise in the most common graphics applications. Versatility characterizes this level. At its highest level of usage, GRAFLIB offers a gallery of canned formats and canned routines for entire specific applications. One call to a canned subroutine, for instance, may draw an entire graph, complete with grid and axis numbering, fancy title and labels, and the input coordinate data plotted as a curve. In terms of speed and performance GRAFLIB represents a substantial improvement over current graphics utilities. Versions of the new library have been installed on the 7600's, the STAR's, and the CRAY. 9 figures. (ERA citation 05:005219)

UCID-30175 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Array Processing for FORTRAN.
C. Wetherell. 27 Aug 79, 77p
Contract W-7405-ENG-48

The charge to a special task force on Cray FORTRAN (STF) included the consideration of ...new language features to exploit the vector hardware of the CRAY-1 that might also be applicable to other large scientific computers. This document is a reference manual for a family of array processing features which extend FORTRAN (specifically LRLTRAN) so that the CRAY-1 can be so exploited. The new array processing features provide access to the computing power of vector machines in a way which is easy for the programer to write, easy for others to read, and easy for compilers to process. The features are designed to be machine independent with efficient implementations available. 18 figures, 3 tables. (ERA citation 04:054002)

UCRL-83238(Rev.1) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Simulation Study of the Traffic Dependent Performance of a Prioritized, CSMA Broadcast Network.
W. B. Watson. 4 Sep 79, 9p CONF-791023-2(Rev.1)
Contract W-7405-ENG-48
Local computer networks conference, Minneapolis, MN, USA, 22 Oct 1979.

A CSMA broadcast network engaged in short to very long message transmission was studied by means of a discrete event simulation. These studies imply that no advantage is to be obtained in a two-trunk network by dedicating one trunk to long message transmission and the other to short message transmission. In addition, the throughput of a single-trunk, multiport network is significantly reduced when one of the ports is attached to a host with a significantly slower host-to-port transfer rate than the others. Finally, a CSMA broadcast network wherein all hosts interact with the same destination (and not each other) can be prone to thrashing, especially at high loads. The networks summarized behave as described largely because the critical resource is host/adapter availability and speed, and not the number or capacity of the trunks, and secondarily because of certain inadequacies of the second-level protocol. 8 figures. (ERA citation 04:057530)

UCRL-83239 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Simulations of Local Computer Networks.
J. W. Yeh. 23 Aug 79, 37p CONF-791023-4
Contract W-7405-ENG-48
Local computer networks conference, Minneapolis, MN, USA, 22 Oct 1979.

The HYPERchannel Network (i.e., HyperNet) is a commercially available product for local computer networking, using the techniques of Carrier Sense Multiple Access (CSMA) and high-speed (50 Mbits/sec) broadcasting trunks. Recently, several proposed local networks utilizing these HYPERchannel products were simulated. A number of rather surprising performance results were found and published in a series of papers. This paper is a report on the modeling technique employed in the study. This technique can be termed a systematic model construction/validation and incremental modeling approach. The concepts and the applications of the technique for modeling local computer networks are presented. Three levels of increments were used. Each level was systematically constructed and validated according to the level of protocols supported by the HyperNet. The detailed tasks of the model construction and validation for each level of model are discussed. The experiences gained from this simulation study are also reported in terms of time and efforts expanded on each level of modeling. 20 figures. (ERA citation 05:009558)

UCRL-83306 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Discussion of Macro Capabilities in FORTRAN.
J. T. Martin. Sep 79, 17p CONF-791111-1
Contract W-7405-ENG-48
Fortran experts meeting ISO/TC97/SC5, Turin, Italy, 12 Nov 1979.

The advantages of adding a macro capability to FORTRAN are propounded. The necessary syntactic features are discussed and the utility of such a capability is illustrated through the use of examples. A particular syntactic mechanism is employed for illustrative purposes. It permits a programer to define syntax appropriate to an application. (ERA citation 05:002369)

9C. Electrical and Electronic Engineering

AD-A086 289/6 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Annapolis MD Propulsion and Auxiliary Systems Dept
Development of a 30,000-Ampere Reversing Contactor.
Final rept.,
Donald B. Steen. May 80, 37p Rept no. DTNSRDC/PAS-79/40

This report describes the design and construction of a double-pole double-throw 30,000-ampere contactor for use in a 400-horsepower experimental propulsion system. The contactor is designed to reverse the polarity of the input current to the motor for motor reversal. The contactor consists of two opposed contact assemblies, each assembly consisting of vie contact plates which are connected by bus bars to the generator and motor terminals. A motor-driven shuttle slides between the contact assemblies to electrically connect pairs of contact plates together to form a double-pole, double-throw center-off configuration. The size of the contactor, exclusive of the drive motor, is 0.533 x 0.406 x 0.139 meter. At 30,000 amperes, contactor losses are less than 2000 watts. The small size and low insertion loss of the contactor is primarily due to an unique multilouvered contact strip which is inserted into slots milled into the surface of the shuttle. These contact strips are rated by the manufacturer for a continuous current density of 466 amperes per square inch. The small size and low loss of this contactor compare favorably with contactors of similar current ratings presently available. Preliminary tests have shown that the contactor meets or exceeds the design specifications and that its characteristics are better than those predicted. (Author)

AD-A086 428/0 PC **A08**/MF **A01**
Clarkson Coll of Technology Potsdam NY
Lumped Nonlinear System Analysis with Volterra Series.
Final phase rept. Nov 78-Nov 79,
H. K. Thapar, and B. J. Leon. Apr 80, 175p
RADC-TR-80-140
Contract F30602-78-C-0102
Prepared in cooperation with Purdue Univ., Lafayette, IN.

This study investigates the application aspect of the Volterra series method to nonlinear system analysis, with special emphasis on nonlinear circuits. The contents are organized into five parts: (1) important aspects of Volterra series method; (2) characterization of multiple nonlinearity circuits (systems) using Volterra series; (3) response on nonlinear systems from Volterra series system characterization; (4) Computer-aided analysis of mildly nonlinear circuits using Volterra series; and (5) concrete examples from the application of Volterra series method to nonlinear circuit problems. Algorithms for adapting the Volterra series method for the computer-aided distortion and zero-state transient analysis of mildly nonlinear circuits are developed next. A symbolic approach is used which not only improves the computational efficiency but also provides a link to the earlier ideas on convergence, etc. An overview of the digital computer program PRANC, which uses the Volterra series method, is also given.

SAND-78-1440 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
Characteristics and Development Report for the MC2913 G-Switch.
H. E. Schildknecht. Nov 78, 82p
Contract EY-76-C-04-0789

This report concerns the MC2913, the reentry g-switch used in the Mk 4 AF and F. Presented and discussed in the report are operating principles, design intent, system requirements, component characteristics, development history, and evaluation test results. (ERA citation 05:009028)

UCID-18298-79-2 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Program Newsletter. Number 2.
W. G. Magnuson, Jr. Sep 79, 48p
Contract W-7405-ENG-48

This issue of the computer program (code) newsletter focuses on electrical network analysis using digital computer programs. In particular, five network analysis programs are described (SCEPTRE, SPICE2, NET-2, CALAHAN, and EMTP). The objective of the program descriptions in this newsletter is to provide a very brief description of the input syntax and semantics, highlight the strong and weak points, and illustrate how the programs can be used at Lawrence Livermore Laboratory. (ERA citation 05:004838)

UCID-18310 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Engineering Research Division Report on Reports Calendar Year 1978.
M. E. Lorton. 2 Nov 79, 52p
Contract W-7405-ENG-48

Each year the Engineering Research Division of the Electronics Engineering Department has issued an internal report listing of all formal publications produced by the division during the calendar year. The report for 1978 is being issued in two sections (the second section has been expanded from the former format due to a change in collection of information implemented during the calendar year 1978). The first section (covering January 1978 through June 1978) lists the titles, report numbers, authors, dates, an author index, and, when applicable, conferences or journals to which the paper was submitted. The second section (covering July 1978 through December 1978) provides, in addition to the above information, abstracts for each paper, and an appendix with keywords. Future publication reports will include abstracts and a keyword appendix for all reports. It is expected that the new format will make the publication report a more useful document. (ERA citation 05:008991)

9D. Information Theory

AD-A086 409/0 PC **A02**/MF **A01**
Moore School of Electrical Engineering Philadelphia PA
Robust and Quantized Wiener Filters for p-Point Spectral Classes.
Interim rept.,
Leonard J. Cimini, and Saleem A. Kassam. 1980, 7p AFOSR-TR-80-0425
Grant AFOSR-77-3154

The classical solution for linear estimation of a signal in additive noise is given by the well-known Wiener filter. In certain circumstances, however, it is advantageous to have a filter which is piecewise constant and which provides good performance over an entire class of signal and noise power spectral densities. First, a procedure is presented for determining the optimal piecewise constant filter. Then, for a particular class of power spectral densities, termed the p-point spectral class, the robust filter is determined. (Author)

AD-A086 410/8 PC **A02**/MF **A01**
Moore School of Electrical Engineering Philadelphia PA
Robust Wiener Filters for Correlated Signals and Noise.
Interim rept.,

George Moustakides, and Saleem A. Kassam.
1980, 7p AFOSR-TR-80-0426
Grant AFOSR-77-3154

In this report, the Wiener filtering problem, when the cross spectral density matrix of the signal and noise is not exactly known is considered the filters which are saddle point solutions for the criterion of performance (mean square error, MSE) over the classes of allowable density matrices are obtained. Solutions for various classes are also given.

AD-A086 516/2 PC **A02**/MF **A01**
Naval Postgraduate School Monterey CA
Selection of Four Good Binary Code Words for use as Addresses and a Note on Error Correcting Codes with References,
Glen A. Myers. Apr 80, 20p Rept no. NPS-62-80-010

The criteria and procedure used to select good binary sequences is described. Both unipolar and bipolar logic are considered. Four good sequences, each having 20 bits, are identified for the choice of bipolar logic. The effects of errors in a sequence and random bits around a sequence are presented. A statement on error correcting codes and a list of chosen references is included. (Author)

AD-A086 567/5 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
Modeling of Pulses Having Arbitrary Amplitude and Frequency Modulation.
Doctoral Thesis,
Francis Martin Lunney. Mar 80, 150p

A model is developed which provides for the generation of the approximate spectra of pulsed signals with arbitrary amplitude and frequency modulation. Error bounds associated with the model are developed providing an insight into performance accuracy. The concept of using two approximate spectra to generate a more exact spectrum by means of computationally trivial calculations is addressed. The model is used to validate the feasibility of using frequency domain discriminants in the signal classification process. (Author)

AD-A086 597/2 PC **A02**/MF **A01**
Weapons Systems Research Lab Adelaide (Australia)
On the Distribution of Signal-to-Noise Ratio when Estimated from a Power Spectrum.
Technical memo.,
A. P. Clarke. Feb 80, 25p Rept no. WSRL-0139-TM

A rigorous derivation is given of a closed form analytic expression for the probability density function of signal-to-noise power ratio when estimated from a power spectrum containing a noisy signal tone. Formulae are given for the mean and variance and sufficient information is also supplied to enable higher order moments to be derived. The derivations of the above formulae are followed by brief considerations of the implications in experimental measurement design. (Author)

AD-A086 604/6 PC **A02**/MF **A01**
ORINCON Corp La Jolla Ca
Multiple Coherence,
Richard Trueblood, and D. L. Alspach. 1978, 8p
Contract N00014-77-C-0296
Presented at the Conference on Systems Science, Nov 78.

The concept of coherence as a measure of the linear relationship between two or more time series is discussed. The definition of coherence in terms of the complex cross power spectral density matrix is given and the relationship between pairwise and multiple coherence and channel signal to noise ratios is discussed. A sample statistic for coherence is given while the details describing the performance which can be obtained from this statistic are contained in a separate report by these authors. (Author)

AD-A086 616/0 PC **A02**/MF **A01**
Maryland Univ Baltimore Dept of Mathematics
Exponential Fourier Densities and Optimal Estimation for Axial Processes,
James Ting-Ho Lo, and Linda R. Eshleman. 4 Dec 77, 9p AFOSR-TR-80-0489
Grant AFOSR-74-2671
Pub. in IEEE Transactions on Information Theory, vIT-25 n4 p463-470 Jul 79.

No abstract available.

9E. Subsystems

AD-A086 281/3 PC **A05**/MF **A01**
Southern Methodist Univ Dallas TX Dept of Electrical Engineering
Estimation of Confidence Limits for Testing Large Logic Networks.
Final rept.,
John L. Fike, C. H. Kapadia, B. Peikari, and K. Kavipurapu. May 80, 83p AFOSR-TR-80-0504
Grant AFOSR-77-3461

This report describes a methodology and means for accurately determining confidence limits for the reliability of large digital networks, without exhaustively exercising all possible input sequences or simulating all logic faults in the network. The report is divided into two parts. In the first part, some mathematical models to estimate the reliability of digital circuits are presented. A heuristic method of assigning weights to faults depending on their 'importance' in a given circuit is described. The models presented can be used to: (a) predict the reliability of a circuit, (b) evaluate test sequences and (c) develop more accurate reliability models of (redundant) fault tolerant computers. The second part of the report deals with the statistical methods of estimating confidence limits. (Author)

AD-A086 330/8 PC **A05**/MF **A01**
Syracuse Univ NY
Experimental Validation of the Antenna Pattern Distortion Computer Program - DISTORT (UHF Antennas).
technical rept. Apr-Nov 78,
Jose Perini, and Hubert Moses. 30 Apr 80, 93p
RADC-TR-80-8, 1842 EEG-TR-80-5
Contract F30602-75-C-0121
See also report dated Dec 77, AD-A049 740.

This report describes the procedures and the experimental measurements carried out to validate the Antenna Pattern Distortion Computer Program (DISTORT) for the AT-197/GR and AS-1097/GR UHF antennas. The report also covers the validation of the reflection coefficient formulation for imperfect earth. (Author)

AD-A086 331/6 PC **A06**/MF **A01**
Ohio State Univ Columbus Electroscience Lab
Airborne Antenna Pattern Code User's Manual.
Technical rept.,
W. D. Burnside, and T. Chu. Mar 80, 108p ESL-711588-2, NADC-80096-30
Contracts N62269-78-C-0379, F30602-79-C-0068

This report describes the use of a computer code to analyze antenna mounted on aircraft fuselage. Ram jet configurations can be handled as a special case by this code. The pattern can be taken in terms of an arbitrary conical cut. The organization of the code, definition of input and output data, multiple finite plate approach to simulate the structures on aircraft and various examples are presented. The analysis is based on the geometrical theory of diffraction, and various computed patterns are compared with experimental results. (Author)

AD-A086 336/5 PC **A04**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
Surface Acoustic Wave Microwave Oscillator and Frequency Synthesizer.
Interim rept. no. 3, 1 Oct 79-1 Apr 80,
D. J. Dodson, and M. Y. Huang. Jun 80, 52p
DELET-TR-78-2992-3
Contract DAAB07-78-C-2992

The objective of the program is the development of Surface Acoustic Wave (SAW) oscillator and synthesizer technology. The two year effort is planned as follows: Task I - Development of SAW devices for oscillator applications at microwave (L-band) frequencies. Emphasis to be placed on achieving wideband tuning capabilities, improved oscillator stability performance and reduced power requirements. Task II - Investigate UHF surface acoustic wave devices which can best impact on synthesizer performance parameters such as: switching speed, minimum frequency step size, total achievable bandwidth, short, medium and long term stability as well as maximum suppression of spurious mode level. Concurrently promising new synthesizer designs will be studied on the basis of these designs to arrive at target specification in a package providing a significant reduction in size, weight and power consumption. Since Task I was completed prior to this reporting period, during the third six months of the program design of the synthesizer circuitry was largely completed. SAW delay line/filters to be used in both the injection locked SAW oscillators and in the SAW Filter Bank have been designed and are being fabricated. The design of the delay lines was based partially on an investigation of the injection locking properties of SAW oscillators. RF/LSI circuitry has been processed and is currently being tested.

AD-A086 426/4 PC **A03**/MF **A01**
Ohio State Univ Columbus Electroscience Lab
Pattern Analysis of a Horn Antenna in the Presence of Obstacles.
Tech nical rept.,
W. D. Burnside, and C. S. Kim. Feb 80, 44p ESL-711588-1, NADC-80095-30
Contract N62269-78-C-0379

No abstract available.

AD-A086 703/6 PC **A02**/MF **A01**
Aerospace Corp El Segundo CA Electronics Research Lab
Theoretical Antenna Analyses.
Interim rept.,
H. E. King, Robert B. Dybdal, and Dorothy S. Chang. 1 Jul 80, 23p TR-0080(5930-06)-1, SD-TR-80-50
Contract F04701-79-C-0080

The results of the analytical work for the Antennas task of the FY 1979 Mission-Oriented Investigation and Experimentation (MOIE) program are summarized. The radiation pattern computation of a 46.8 lambda diameter paraboloidal reflector antenna is compared with experimental results. The pattern analysis accounts for the feed blockage and feed-strut scatter. Good agreement between the theoretical and experimental results exists for wide-angle sidelobes. The diffraction levels from a half-plane edge and a rounded edge were computed, and good correlation with experimental results is indicated. The radiation patterns of a monopole mounted on a circular and a rectangular ground plane were also computed. (Author)

JINR-13-12019 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Time-Dependent Filter for Spectrometric Amplifiers.
O. V. Ignat'ev, N. F. Shkola, and A. I. Kalinin. 1978, 9p
In Russian.
U.S. Sales Only.

Filters for spectrometric amplifiers are considered. Noise and counting rate performances of a common time-dependent filter consisting of a delay line shaper and a contral RC-integrator are analyzed. By the weight function method the general expressions for dispersion of parallel and series noises are derived. The filter normalized noise coefficient is 1.125, the pulse duration is 1.35sub(tau sub 0)+0.5 mks, where tau sub 0 is the noise corner time constant of the CR-RC-filter. The experimental dependence of energy resolution on the counting rate is given. (Atomindex citation 10:470891)

N80-27555/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Focal Axis Resolver for Offset Reflector Antennas.
R. F. Schmidt. May 80, 36p NASA-TM-80683

Described are electrical means for determining the focal axis of an offset reflector antenna whose physical rim is not coincident with the boundary of

the electrical aperture. Even and odd sensing functions are employed in the focal region, leading to both amplitude and phase criteria for resolving a focal axis generally inclined with respect to the system axis. The analytical aspects of the problem are discussed, and an example related to a 4-meter Large-Antenna Multiple-Frequency Microwave Radiometer (LAMMR) is included. The technique is useful for focal axis determination in mathematical simulations and in the physical world.

N80-27556/3 PC **A08**/MF **A01**
North Carolina State Univ., Raleigh. Dept. of Electrical Engineering.
Computer Prediction of Large Reflector Antenna Radiation Properties.
A. Botula. Jul 80, 169p NASA-CR-163253
Grant NSG-1588

A FORTRAN program for calculating reflector antenna radiation patterns was rewritten and extended to include reflectors composed of a number of panels. These individual panels must be analytic surfaces. The theoretical foundation for the program is as follows: Geometrical optics techniques are used to trace rays from a feed antenna to the reflector surface and back to a mathematical plane just in front of the reflector. The resulting tangential electric field distribution, assumed to be the only source of forward radiation, is integrated numerically to calculate the radiation pattern for a desired set of angles. When the reflector is composed of more than one panel, each panel is treated as a separated antenna, the ray-tracing procedure and integration being repeated for each panel. The results of the individual aperture plane integrations are stored and summed to yield the relative electric field strength over the angles of interest. An example and several test cases are included to demonstrate the use of the program and verify the new method of computation.

N80-27601/7 PC **A06**/MF **A01**
Texas Instruments, Inc., Dallas.
ic Ku-Band Impatt Amplifier.
Final Report, 1 Jun. 1977 - 31 Jan. 1979.
V. Sokolov, M. R. Namordi, F. H. Doerbeck, and W. R. Wisseman. Mar 79, 111p NASA-CR-160004
Contract NAS5-24182

High efficiency GaAs low-high-low IMPATTs were investigated. Theoretical analyses were employed to establish a design window for the material parameters to maximize microwave performance. Single mesa devices yielded typically 2 to 3 W with 16 to 23% efficiency in waveguide oscillator test circuits. IMPATTs with high reliability Pt/TiW/Pt/Au metallizations were subjected to temperature stress, non-rf bias-temperature stress, and rf bias-temperature stress. Assuming that temperature is the driving force behind the dominant failure mechanism, a mean-time-to-failure considerably greater than 500,000 hours is indicated by the stress tests. A 15 GHz, 4W, 56 dB gain microstrip amplifier was realized using GaAs FETs and IMPATTs. Power combining using a 3 db Lange coupler is employed in the power output stage having an intrinsic power-added efficiency of 15.7%. Overall dc-to-rf efficiency of the amplifier is 10.8%. The amplifier has greater than a 250 MHz, 1 db bandwidth; operates over the 0 deg to 50 C (base plate) temperature range with less than 0.5 db change in the power output; weighs 444 grams; and has a volume of 220 cu cm.

PATENT-4 161 023
Not available NTIS
Department of Energy, Washington, DC.
Up-and-down Chopper Circuit.
Patent,
J. R. Goffeau. Filed 7 Sep 77, patented 10 Jul 79, 6p PAT-APPL-831 302
Supersedes PAT-APPL-831 302-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved up-and-down chopper circuit is provided which is useful for voltage regulation in a bidirectional dc power system. In the down mode, power is switched from a dc power source to a lower voltage energy storing load while in the up mode stored energy in the load is transferred to the higher voltage source. The system uses Darlington transistor switches in a conventional connection. The improvement relates to circuit additions to eliminate the effects of inter-electrode capacitance inherent with this Darlington transistor switching arrangement. 3 claims. (ERA citation 05:029493)

9F. Telemetry

AD-A086 700/2 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Telemetry System for Evaluation of Burn Protection in Full-Scale Fuel Fire Manikin Exposures.
Final rept.,
J. R. Piergallini, and A. M. Stoll. 1 May 80, 11p
Rept no. NADC-80092-60

An eighteen channel PAM/FM (Pulse Amplitude Modulated/Frequency Modulated) telemetry system was developed for measuring temperature rise on the surface of a manikin beneath protective clothing for full-scale fuel fire exposures in completely enveloping flames. Thermistors are used as temperature sensors at various locations on a manikin surface and backed by material of known thermal properties in order to correlate temperature rise with skin burn damage. The transmitted signals are recorded on analog magnetic tape and converted to a digital format for computer analysis. The clothed manikin is passed through an aviation gasoline fire for three seconds with the telemetry system recording data during this period. Temperatures are analyzed at 0, 1, 2 and 3-second intervals with voltage outputs from the thermistors being converted to resistance readings and temperature readings by equations developed from curves of thermistor characteristics. Experimental results with respect to burn prediction are in agreement with data obtained by analysis of vesicant papers calibrated radiometrically to correlate with temperature-time effects productive of burns in living tissue. To date, 12 full-scale fuel fire tests have been conducted using the telemetry system and the performance of this system has exceeded original expectations in many respects such as sensitivity, accuracy and freedom from interference by ionizing gases within the flames. (Author)

10.

ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A086 573/3 PC **A07**/MF **A01**
Army Military Personnel Center Alexandria VA
Spatial Variations in Energy Accessibility in the Soviet Union, 1960-1975.
Final rept.,
Russell Victor Olson, Jr. 19 Jun 80, 143p
Master's thesis.

The emphasis in coal, oil, and natural gas production in the Soviet Union shifted dramatically eastward after 1960, but spatial patterns of energy accessibility remained fairly stable from 1960 to 1975. Utilizing annual coal, oil, and natural gas production data expressed in terms of standard fuel units and distances measured along railroad and pipeline routes, an energy potential model permitted the computation of energy potential indices based on distance and distance modified by generalized transport costs for 129 major administrative and industrial centers for 1960, 1970, and 1975. A general purpose contouring program mapped relative energy potential indices, and these maps showed that the areas with the highest energy accessibility were also among the most important industrial areas. A correlation analysis between energy accessibility and urban population growth revealed that changes in energy accessibility have had a modest influence on urban population growth rates. Soviet industrial location and urban population growth have been relatively unrestrained by the location of energy resources. (Author)

AED-Conf-78-170-005 MF **A01**
Eidgenoessische Technische Hochschule, Zurich (Switzerland).
Preconditions and Possibilities of Solar Energy Utilization.
P. Fornallaz. 1978, 21p CONF-7805199-1
In German.SVA information meeting on nuclear power and alternatives as reflected in public opinion, Zurich, Switzerland, 29 May 1978.
U.S. Sales Only. Microfiche copies only.

The problem of solar energy utilization is dealt with under technical, economical and ecological aspects. Based on discussion of a nation's energy needs, the conclusion is drawn that there are 5 important criteria which determine the utilization possibilities of solar energy within the framework of the overall energy supply: (1) Which secondary energies can be produced with solar energy; (2) Can the energy waste be curbed; (3) How does solar energy rate in comparison with conventional plants under aspects of rentability; (4) In connection with the utilization of solar energy, no methods are to be used which disturb the balance in the biosphere in a lasting and fatal way. In particular, those methods have to be avoided which introduce additional energy into the biosphere, the result of which are big energy shifts; and (5) Every solar plant is to produce much more useful energy than is used for its production, its operation and dismantling. The basis for the whole discussion is the energy situation in Switzerland, to which a lot of references are made. (ERA citation 05:020271)

AED-CONF-78-155-034 PC **A02**/MF **A01**
Brown, Boveri und Cie A.G., Mannheim (Germany, F.R.).
Harvest Factor: Assessment Key for Efficient Energy Utilization.
U. Moeller, and G. Brabandt. 1978, 11p CONF-7804102-1
In German.Systems exhibition energy within the context of the Hannover fair, Hannover, F.R. Germany, 19 Apr 1978.

The question is discussed of whether new criteria are needed which do the problem of assured energy supply more justice than conventional economic viability considerations, and whether a new key would thereby be created for using the remaining energy reserves more efficiently. Critical points for the proponents of the 'harvest' factor can be classified as follows: replaceability of money by energy; methodical shortcomings in practical application; and the partial aspect theorem. These problems are analyzed. (ERA citation 04:026742)

DOE/EIA-0136 MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
All Electric Homes. Annual Bills: January 1, 1978, Cities of 50,000 and More. Energy Data Report.
Oct 78, 30p
Microfiche copies only.

Information is presented on the average annual costs to residential consumers for representative amounts of electricity used exclusively for all domestic purposes. Average annual electric bills, average charges per kilowatt-hour and average kilowatt-hour consumption in all-electric homes are shown on a nationwide basis and for each state and individual communities throughout the United States. (ERA citation 05:004667)

GU-FE-62 PC **A07**/MF **A01**
Goteborg Univ. (Sweden). Institutionen foer Foeretagsekonomiska.
Changes in Energy Use of Industry and Their Consequences for Input-Output Analyses.
B. Andersson, and P. A. Bergendahl. 1979, 145p

In Swedish.
U.S. Sales Only.

In input-output models, the energy consumption is represented by a coefficients, which shows the energy needed to produce one unit of goods in an industrial sector. This report examines the changes of the coefficient, in time and variations depending on size and location of the industry. Trends in the coefficients are found, and prognoses of the future development are made. Mining, steel, chemical, paper, and engineering industries are studied. (ERA citation 05:020721)

IKE-K-54-19 PC **A02**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Energy-Industry-Environment System of Baden-Wuerttemberg.
K. H. Hoecker. Nov 79, 20p
In German.
U.S. Sales Only.

Following some general remarks on the task and function of systems analyses in society, remarks are made on the description of development trends by models and on the goals of systems analysis. As an example for modelling, the development of the structure of space heating and hot-water consumpton in Baden-Wuerttemberg is described. (ERA citation 05:024176)

NP-23761 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Space Science and Engineering Center.
Scientific Investigations of Tropical Wind, Energy Conversion and Reference Level Experiment (TWERLE). Final Technical Report, July 1976–September 1977.
V. E. Suomi, W. Massman, B. Hinton, and J. Afanasjevs. Jan 78, 42p

The results from the Tropical Winds, Energy Conversion and Reference Level Experiment (TWERLE) for the period July 1976 through 6 September 1977 are summarized. These results are: a latitude profile of the rate of conversion from kinetic to potential energy for the period from 12 June 1975 to 1 August 1976; evidence that gravity waves generated in the troposphere systematically deposit energy in the vicinity of the tropopause, and are a mechanism for the dissipation of kinetic energy on the global scale; and evidence that the jet stream is an important mechanism for generating these waves. (ERA citation 04:042814)

NP-23790 PC **A03**/MF **A01**
Texas State House of Representatives, Austin. Committee on Energy Resources.
Interim Hearings and Studies on Energy Resources Problems and Proposed Legislation.
44p

No abstract available.

NP-23796 PC **A06**/MF **A01**
New York State Legislative Commission on Energy Systems, Albany.
Operation Bootstrap: Renewable and Efficient Energy for New York State.
D. Haley. 1977, 110p

Operation Bootstrap is a self-help program designed to make sure that the vast sums spent on energy in New York state are spent to the extent sensible and possible within New York, creating jobs and stimulating business. The theme of the report is how much can be accomplished and how quickly by conservation and renewable energy systems applicable to New York. Following a chapter to begin Part I discussing energy independence, a discussion on energy conservation is presented. The following are then presented: Efficiency/Conservation in Electricity; Bootstrap Technologies (inertial storage or flywheels, wind energy, bioconversion, solar collectors and cells, new patterns with solar energy, recycling of wastes); Nuclear Energy; Power Transmission; Alternatives to the Electric Distribution System; The Power Authority; The Safe Energy Act; Phantom Taxes in Your Electric Bill; Empire State Power Resources Inc.; Natural Gas; Proposed Gas Rate Surcharge for Gas Exploration; Who Owns What; and The Status Quo. Part II, Jobs and Energy, is an analysis of the employment-creation potential of the Operation Bootstrap approach. (ERA citation 04:044909)

NP-23848 PC **A03**/MF **A01**
National Governors' Association, Washington, DC.
Organization of the State Energy Office: Selected Approaches.
Feb 79, 45p

The Committee on Natural Resources and Environmental Management receives many requests on how various states organize, finance, and operate their state energy offices. This publication contains five papers prepared by state energy officials describing their energy programs as they functioned in December, 1978. The state energy officials presenting papers are Vincent DiCara (Maine); John P. Millhone (Minnesota); J.W. Abbott (Missouri); Brian M. Flattery (North Carolina); and Edward J. Spitzer and Jack A. Thomas (Tennessee). (ERA citation 04:050148)

NP-23851 PC **A05**/MF **A01**
New York State Energy Research and Development Authority, New York.
New York State Energy Consumption and Supply Statistics, 1960--1976.
J. Tarantino, M. Schultz, and C. Searle. 1978, 90p

Data are presented on New York energy consumption and supply necessary to analyze present and future resource use and supply within the state. The report presents a summary of total consumption of primary resources in New York by fuel type for the period 1960 through 1976; the total direct consumption of each fuel by sector and final end use for 1975 and 1976; the sources of energy consumed in New York including production of primary resources within the state and the origin of petroleum and natural gas delivered into the state; and a preliminary estimate of 1977 primary energy consumption by fuel type and corresponding 1975 and 1976 data. Additional information and data are presented in 8 appendices. Extensive tables and graphs on petroleum, natural gas, coal, hydro, and nuclear power required for producing heat and power are included. (ERA citation 04:050198)

NP-23896 PC **A07**/MF **A01**
New York State Legislative Commission on Energy Systems, Albany.
Legislating for Energy Independence: The Legislative Commission on Energy Systems. Report to the Governor and the Legislature on Its Studies.
Sep 78, 141p

The goals of the Legislative Commission on Energy Systems, established in 1975, are to foster legislation which will minimize the impact of the energy crisis upon the citizens of New York State, while maintaining economic growth and a healthy environment. The Commission has in the past initiated major energy legislation such as that establishing the State Energy Office and several acts involving financing, standards, and tax-abatement for energy-saving systems. The Commission's role in the Legislature is to gather and provide information in the field of energy by means of hearings, conferences, and research; to prepare legislation dealing with energy; and to coordinate the many facets of the energy problem which are handled separately by several standing committees. The Commission has presented nine bills as priority legislation for the 1978 Session, and has cooperated in the preparation and passage of legislation for the State Energy Plan. (ERA citation 04:050211)

NP-23911(V.1) PC **A04**/MF **A01**
Hawaii Natural Energy Inst., Honolulu.
Energy Self-Sufficiency For the County of Maui. Volume 1. Energy Data Update.
R. Masuda, A. Seki, P. K. Takahashi, and P. C. Yuen. Jun 79, 60p

The basic energy data from which a Maui County energy self-sufficiency development and implementation plan will be drawn are presented. Treatment has been restricted to a number of comparative analyses, a comprehensive representation of the present energy picutre for Maui County, and future energy trends. It is concluded that petroleum is the key fuel that needs to be substituted. Although Maui is the chief petroleum consumer in the County, a significant portion of the total energy budget includes alternate sources such as bagasse and hydroelectric power. Molokai and Lanai are totally dependent on petroleum. It will be a major challenge to develop natural alternatives to replace petroleum. (ERA citation 05:001181)

NP-23911(V.2) PC **A07**/MF **A01**
Hawaii Natural Energy Inst., Honolulu.
Energy Self-Sufficiency for the County of Maui. Volume II. Developmental Plan.
R. Masuda, A. Seki, P. K. Takahashi, and P. C. Yuen. Jun 78, 137p

Alternative routes by which energy self-sufficiency can be reached in Maui County are outlined in Volume II. The analysis considers the economic, environmental, sociological, political, and technological factors in designing a flexible framework which can be used by the people of Maui County to determine their energy destiny. Following a summary of Volume I, indigenous energy alternatives (biomass, wind power, solar energy, geothermal energy, ocean thermal energy conversion, hydroelectric energy) are summarized. The present status of new technologies and an energy scenario for the county are discussed. An energy self-sufficiency analysis focuses on electrical and net energy self-sufficiency. The data for 1976 bring together the latest information available. In addition to 70% petroleum, sugar cane and hydroelectricity provide all the energy used in the county. (ERA citation 04:056813)

NP-23911(V.3) PC **A06**/MF **A01**
Hawaii Natural Energy Inst., Honolulu.
Energy Self-Sufficiency for the County of Maui. Volume III. Energy Plan.
R. Masuda, A. Seki, P. K. Takahashi, and P. C. Yuen. Jan 79, 112p

Volume I presented the current energy picture of Maui county, while Volume II projected a number of tentative energy scenarios. This volume, Vol. III, comprehensively analyzes the future of energy in the county and selects the most-probable scenario. The scenario assumes Maui County's present high growth rate will eventually drop to a moderate and then a low rate. The county can reach energy self-sufficiency in 1995 at a cost of $710.9 million. The major natural energy resouces are the indigenous ones: geothermal, biomass, wind, and solar. Conservation, of course, will play an important role. An energy plan is drawn up, which details the development program for the components - each natural energy resource, conservation, submarine electric cable, transportation, conservation, legislation, community awareness and interaction, and energy plan updating. 34 references. (ERA citation 04:056814)

NP-23912 PC **A05**/MF **A01**
California Energy Commission, Sacramento.
Natural Gas Supply and Demand for California 1978-1995. Appendix C. Displacement of Natural Gas Use Through Solar Thermal Applications: Estimated Residential Gas Demand Savings in California from the Use of Solar Water and Space Heating 1979-1990. (Corrected Version).
15 Mar 78, 84p

Most forecasts of natural gas demand do not adequately reflect the potential of alternative energy sources, such as solar energy, to reduce gas demand. This analysis provides estimates of solar energy's penetration into the residential gas water and space heating markets. The effect of increased utilization of solar energy on residential and total demand for natural gas is estimated for two policy options within the framework of the forecast developed by the Commission's Energy Assessment Division. A conservative estimate was made of the proportion of the gas demand projected for residential water and space heating which can be displaced by solar systems, for the years 1978 to 1985 and 1990. Solar market penetration was simulated for two government policy options: a tax incentive scenario and a mandating scenario. Conservative savings of 2 to 4% of forecasted 1985 residential gas demand, and 6 to 9% of 1990 residential demand were found. (ERA citation 04:056764)

NP-23925 PC **A03**/MF **A01**
California Energy Commission, Sacramento.
Potential Natural Gas Supplies to California from the Texas Intrastate Market.
Mar 78, 38p

This appendix is divided into three parts: a study of Texas natural gas supply and demand, a critique of Part 1, and a legal memorandum on purchases of natural gas from the intrastate market for resale in California. (ERA citation 04:056041)

NP-23935 PC **A04**/MF **A01**
Wisconsin Dept. of Administration, Madison. Office of State Planning and Energy.
Residential Conservation Options for Wisconsin: An Analysis of Residential Space Heating Energy Use, 1970 to 2000.
E. L. Hershberg, G. C. Krohm, and J. C. Yingling. Apr 79, 60p

This study examines three weatherization policy options and their impacts on residential-space-heating energy consumption in Wisconsin. The weatherization policies were analyzed with the Wisconsin Residential Energy Model to determine potential energy savings for the state. By comparing the weatherization policy options to a projection of present and future conservation efforts, a quantitative determination of possible energy savings was established. Along with these statewide energy savings projections, a cost benefit analysis was performed to determine representative individual energy savings and payback periods. Finally, a brief discussion of the social benefits that can accrue from weatherization has been included. (ERA citation 04:055163)

NP-23943 PC **A03**/MF **A01**
Wisconsin Dept. of Administration, Madison. Office of State Planning and Energy.
Protecting Solar Access: Report of the Governor's Special Study Committee on Solar Rights.
Apr 78, 34p

In the spring of 1977 the Wisconsin Office of State Planning and Energy, Department of Administration, under order from former Governor Patrick J. Lucey, established a Special Study Committee to address the legal uncertainties of using the sun as a permanent source of energy. The Governor noted that a major impediment to widespread solar energy use is the uncertainty of an individual's right to an uninterrupted light source once a solar system has been installed. The Committee's charge was to examine in detail the various ways to protect solar access, decide whether or not legislation is necessary, and recommend the form such legislation should take. Following its appointment in June 1977, the committee of solar energy experts examined the full range of techniques available for protecting solar rights. This included all legislation proposed and enacted in other states. The committee weighed the advantages and disadvantages of three general approaches to protecting solar rights - solar easements, land use regulations, and legislative creation of a right to light. The committee's deliberations and conclusions are summarized. (ERA citation 04:056213)

NP-23971 PC **A04**/MF **A01**
California Energy Commission, Sacramento.
Directory of Central Air Conditioners.
84p

Tabulated data on central air conditioners are presented. Information is included on manufacturer's name, brand name, model number, type of unit, cooling capacity, power input in watts, and energy efficiency ratio for every unit. Heat pump equipment has additional data on heat input and output and coefficient of perfomance. (ERA citation 05:001230)

NP-23979 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Applications.
Testimony of Ms. Omi Walden, Assistant Secretary for Conservation and Solar Applications, FY 1980 Authorization Hearings.
Feb 79, 22p

The overall goal of the Office of Conservation and Solar Applications is to reduce the nation's dependence on petroleum-based fuels. This will be accomplished by reducing waste in the way the Nation uses energy; by providing more energy-efficient technologies and practices for the end-use sectors; and by encouraging a transition to more abundant fuels, especially renewable energy sources such as solar energy. Ms. Walden then reviewed her efforts since she joined the DOE. The major programs for which funds are requested for FY 1980 are discussed. The objectives of the Office of Buildings and Community Systems are summarized and a funding request of $86 million for 1980 is indicated. The objectives and proposed activities of the other major programs are given, with funding requested as follows: Industrial Energy Conservation Program, $42 million; Transportation Programs, $99 million; Office of State and Local Programs, $316 million; Appropriate Technology Small Grants Program, $8.5 million; Office of Solar Applications, $156 million. Ms. Walden also cites the funding requests for subprograms in the budget discussion. (ERA citation 04:056204)

NP-24011 PC **A12**/MF **A01**
Ifo-Institut fuer Wirtschaftsforschung, Munich (Germany, F.R.).
Effects of Tariffing on Electricity Demand with Special Regard to the Sales Structure and Electricity Uses in the Federal Republic of Germany.
M. Horn, P. Rammner, and L. Scholz. 1978, 259p
In German.
U.S. Sales Only.

The Ifo-Institute carried out an investigation not only of theoretical considerations and literature searches but also written questionings and more than 20 interviews with energy-supply firms. A demoscopy on the attitudes towards current consumption was carried out in 2000 households. The individual steps of the investigation were permanently coordinated with Sect. III B1 of the Federal Ministry of Economy. After explaining the goals of economic and political restructuring of the current tariff system, the structures of current consumption and tariff system are investigated. The consumers' attitude towards future current price rises is presented as an important result of the investigation. In the appendix, extensive figures concerning current price elasticity of the households and their attitude towards current tariffs and current consumption are given. (ERA citation 05:007274)

NP-24030 PC **A03**/MF **A01**
Kraftanlagen A.G., Heidelberg (Germany, F.R.).
We Work with Energy.
A. G. Kraftanlagen. 1979, 46p
In German.
U.S. Sales Only.

This brochure deals with current questions in national economics and economic and social policy. To illustrate the completely, the individual departments of the company discuss work in the fields of geothermal heat, solar energy, heat pumps, wind energy, and bioenergy. This is followed by the 1978 company report and annual balance. (ERA citation 05:003208)

NP-24040 PC **A06**/MF **A01**
International Energy Agency, Paris (France). Committee on the Safety of Nuclear Installations.
Annual Report on Energy Research, Development, and Demonstration. Activities of the IEA, 1978-1979.
1979, 107p
U.S. Sales Only.

The objectives of the IEA's energy R, D, and D program are to assure the development and application of those new and improved energy technologies that offer the potential of making a significant contribution to energy needs, and which can help in reducing long-term dependence on oil. To achieve these objectives, the IEA has embarked upon three principal R, D, and D activities: development of a strategy for energy R, D, and D; fostering of effective national programs of energy R, D, and D (including collaborative planning where feasible) through a process of national program reviews; the establishment and conduct of cooperative energy R, D, and D projects in priority areas. This report describes briefly the work underway in each of these activities, and gives summary results reported to the IEA Secretariat by mid May 1979. Various agencies are working on: energy research, development, and demonstration strategy; conventional energy systems, and non-conventional energy systems. (ERA citation 05:007261)

NP-24047 PC **A03**/MF **A01**
Vereinigung Deutscher Elektrizitaetswerke e.V., Frankfurt am Main (Germany, F.R.).
Electricity Supply in the Federal Republic of Germany including West Berlin in 1977.
1978, 48p
In German.
U.S. Sales Only.

The main data of the electric power industry concerning the generation, transport, and consumption of electricity in the Federal Republic of Germany are presented in a summary. The report is supplemented by many figures, diagrams, and tables. (ERA citation 05:007275)

NP-24101 PC **A02**/MF **A01**
Ontario Ministry of Energy, Toronto.
Energy Security for the Eighties: A Policy for Ontario.
Sep 79, 20p
U.S. Sales Only.

A policy for Ontario for energy security is discussed in the following topics: Ontario's energy future: facing facts for the eighties; Ontario's response to the crude oil deficit; framework for crude oil self-sufficiency by 1995; National Plan for crude oil self-sufficiency by 1995; Ontario's proposal for a National Plan for crude oil self-sufficiency; natural gas: a policy on price and supply; consumer and job protection: adjustments to higher oil prices; a National Petroleum Company: a basic need; Ontario's energy security: a provincial policy; Ontario's indigenous energy supply - 1978-1995; the cost; conservation and reduced energy growth; Zero Crude Growth by 1985; and initiatives to achieve Zero Crude Growth. (ERA citation 05:004597)

NP-24119 PC **A11**/MF **A01**
Tata Energy Research Inst., Bombay (India).
Directory of Solar Energy Research Projects in India.
1978, 231p
U.S. Sales Only.

This directory contains data on 140 research projects in the area of Solar Thermal Conversion and Photovoltaic Processes. It includes the following: subject categories, list of institutions, list of investigators, and project information sheets. (ERA citation 05:002792)

NP-24125 PC **A02**/MF **A01**
Wirtschaftsverband Erdoel- und Erdgasgewinnung e.V., Hanover (Germany, F.R.).
Energy Potential North Sea.
1977, 16p
U.S. Sales Only.

Petroleum and gas reserves in the North Sea, offshore drilling technology, submarine pipeline laying and the supply of goods necessary for offshore technology are reported. (ERA citation 05:002485)

NP-24129 PC **A05**/MF **A01**
Kiel Univ. (Germany, F.R.). Inst. fuer Weltwirtschaft.
Decoupling of Economic Growth and Energy Consumption.
A. D. Neu. 1978, 95p
In German.
U.S. Sales Only.

This contribution to energy discussion deals with possibilities and some promising solutions on how to cover the future energy demand without being dependent on an inflexible bond between economic growth and energy consumption. In order to support the statements presented numerous data from the field of energy production and consumption are given. (ERA citation 05:003187)

NP-24136 PC **A09**/MF **A01**
Hanover Univ. (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Systems Analysis of Technological Response Factors.
R. Bauerschmidt. 1978, 191p
In German.
U.S. Sales Only.

This study summarizes the technological application factors (e.g., energy, work, material) in a

widely entwined economic structure. An energy demand model based on the results of this investigation was designed from which the development until the year 2000 can be estimated. Starting from the final demand for goods and services the production requirements for all sectors of free enterprise were derived considering intersectoral entanglements and, eventually, the energy demand. (ERA citation 05:003156)

NP-24145 PC **A06**/MF **A01**
Indian Inst. of Science, Bangalore. Dept. of Aeronautical Engineering.
Low-Cost Water Pumping Windmill Using a Sail-Type Savonius Rotor. Report 79 FM 2.
S. P. Govinda Raju, and R. Narasimha. Jan 79, 107p
Portions of document are illegible.
U.S. Sales Only.

A water pumping windmill which can be built largely using materials and skills available in rural areas has been designed and fabricated. The windmill uses a Savonius rotor and incorporates a novel sail-type construction. The pump is of positive displacement type using the casing of a pneumatic type for the pumping chamber. Two prototypes have been constructed and these have indicated a reasonable performance and reliability. (ERA citation 05:004464)

NP-24172 PC **A15**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Project Management for Energy Research.
Program for Energy Research and Technologies, 1977-1980. Annual Report 1978 on New Sources of Energy.
1978, 347p
U.S. Sales Only.

Supported projects in the Program for Energy Research and Technologies 1977-1980 of the FRG, excluding projects relating to nuclear energy and fusion research are reviewed. The report comprises: as forewords, the relevant passages from the Program for Energy Research and Technologies, 1977-1978, brought up to date in certain passages and supplemented with explanatory diagrams and illustrations, and inserted at the beginning of the descriptions of the individual supported projects within the 3 subprograms; a list of supported projects according to the position a the end of 1978. This is broken down according to the three subprograms: efficient uses of energy in application and in secondary energy; coal and other fossil sources of primary energy; and new sources of energy. These form the classification headings and are reproduced with a subject area subdivision. The individual projects have been assigned a program number. Descriptions of the individual sponsored projects are shown in numerical sequence of the program numbers in the project list and divided according to the three subprograms. (ERA citation 05:005820)

NP-24179 PC **A04**/MF **A01**
Materialdienst des Sozialwissenschaftlichen Instituts der Evangelischen Kirchen in Deutschland, Bochum (Germany, F.R.).
Energy Policy and the Job Situation.
K. Kaiser. 1978, 69p
In German.
U.S. Sales Only.

Starting from an evaluation of prognoses regarding energy consumption and economic growth, the effects of several possibilities of energy supply in the future and of energy saving on employment are investigated. A high employment effect is expected from investments in the fields of environmental techniques, development of alternative energy sources, and efficient energy use. From the employment-political point of view, the utilization of nuclear energy is thought to be unnecessary and replaceable by other technologies (e.g., coal power plants). (ERA citation 05:007254)

NP-24192 PC **A07**/MF **A01**
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen.
Cylinderparabolical Collectors for Thermal Solar Power Plants.
M. Kuczera. 2 Dec 78, 150p
In German.Thesis.
U.S. Sales Only.

It is the goal of this work to lay out a special type of collector as a component of a thermal solar power plant. The collector is a one-axis swivelable, cylindrical parabolic mirror that concentrates solar radiation on a heat pipe aligned in the focal line. To make a statement on the functioning of the collector, first the conditions of the incoming radiation are investigated. The investigations on the energy transform mechanisms lead to a system of balance equations, that were iteratively solved along the collector axis. The following influences were investigated on the systems values, e.g., local and mean coefficients of efficiency, temperatures, and energy flows by means of the solution algorithm: diameter of the absorber, factor of concentration, properties of the absorber, mass flow, pressure of operation, air temperature, wind velocity, incoming radiation, slit width, between absorberpipe and coverpipe, vacuum in the coverpipe. (ERA citation 05:006783)

NUREG/CR-1295 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
The ORNL State-Level Electricity Demand Forecasting Model,
W. S. Chern, J. W. Dick, C. A. Gallagher, B. D. Holcomb, and R. E. Just. Jul 80, 172p ORNL/NUREG-63
Contract W-7405-eng-26

This report presents further results of validating Version I of the ORNL-SLED Model, an investigation of structural changes in electricity demand, an update of the Version I model as Version II, the electricity cost forecasting model, and the forecasts of electricity demand and prices by sector and by state for 1977-2000. A new set of the assumptions of exogenous variables was developed and used to forecast electricity demand and prices.

N80-27807/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
ASHMET: A Computer Code for Estimating Insolation Incident on Tilted Surfaces.
R. F. Elkin, and R. G. Toelle. May 80, 44p NASA-TM-78286
Sponsored in Part by DOE.

A computer code, ASHMET, was developed by MSFC to estimate the amount of solar insolation incident on the surfaces of solar collectors. Both tracking and fixed-position collectors were included. Climatological data for 248 U. S. locations are built into the code. The basic methodology used by ASHMET is the ASHRAE clear-day insolation relationships modified by a clearness index derived from SOLMET-measured solar radiation data to a horizontal surface.

PB80-202278 PC **A02**/MF **A01**
Office of the Federal Inspector for the Alaska Natural Gas Transportation System, Washington, DC.
Quarterly Report No. 4 to the President and Congress on the Construction of the Alaska Natural Gas Transportation System.
Jul 80, 25p OFI-80/6

The items discussed in this report have been selected to provide an accurate, overall picture of the recent progress on the Alaska Natural Gas Transportation System (ANGTS). Significant developments occurring during the second quarter of Calendar Year 1980 are discussed.

PB80-205099 Not available NTIS
National Bureau of Standards, Washington, DC.
Comparison of Solar Simulator and Outdoor ASHRAE Standard 93 Thermal Performance Tests.
Final rept.,
E. Streed, D. Waksman, A. Dawson, and A. Lunde. 1980, 5p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Proceedings of American Section/International Solar Energy Society 1980 Annual Meeting, Phoenix, AZ p405-409, 2-6 Jun 80.

Standard test methods for determination of solar collector thermal performance permit the use of solar simulators. A comparison of efficiency measurements for seven collectors of varying construction and materials is used to illustrate the high bias in results when using two types of solar simulators as compared to outdoor measurements. Spectral distribution, sky temperature and collector tilt angle are shown to be parameters that must be considered in addition to the normal environmental test conditions of wind, irradiance, diffuse fraction and ambient temperature when comparing indoor and outdoor test results.

PB80-205370 PC **A07**/MF **A01**
Jensen Associates, Inc., Boston, MA.
Conservation Opportunities within the Gas Industry.
Final rept.,
Edwin F. Hardy, John C. Loose, Robert G. Paszkiewicz, Nancy J. Pozar, and Rand Barthel. 1 Apr 80, 137p GRI-78/0042
Contract GRI-5011-310-0153

The primary objective of this project is to identify and analyze opportunities for improvements in gas industry operations which will increase their efficiency and decrease costs. Gas industry operations from the wellhead to the final sale are included in this analysis. The study plan progresses from identifying gas industry uses of gas and estimates of their volumes to identifying methods of reducing these uses and estimates of their conservation potentials, assuming reasonable application of the methods identified. The concluding step of the study is the ranking of recommendations for increased gas conservation in gas industry operations.

PB80-208408 PC **A06**/MF **A01**
Department of Transportation, Washington, DC. Office of the Secretary.
Energy Conservation Potential of Off-Highway Recreational Motor Vehicles.
Report to the Congress.
Dec 79, 117p

The report defines the general characteristics of recreational motor vehicles; delineates industry, market and owner characteristics; examines possible fuel conservation options under alternative scenarios; estimates fuel conservation potential; and provides general recommendations for future fuel conservation programs.

PNL-SA-6918(Rev.1) PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Wind Resource Assessment Status.
L. L. Wendell. 1979, 13p
Contract EY-76-C-06-1830
Portions of document are illegible.

The first objective of the WCPE's regional assessment was to develop and test prototype techniques for the analysis of wind-energy potential and distribution over a large area. These techniques involved the utilization of a much larger data set, the application of meteorological and topographic factors in the analysis, and the use of indirect methods of wind power estimation in areas where no wind measurements existed. Five states in the Pacific Northwest were selected as a test of these techniques. (ERA citation 05:010030)

PNL-SA-7603 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Siting Small Wind Turbines.
W. T. Pennell, and H. L. Wegley. Mar 79, 16p
Contract EY-76-C-06-1830

A recent survey has indicated that improper siting has been a common cause of dissatisfaction among users of small wind turbines. That is, the user has not received the power output or machine life he expected. Most potential purchasers will need to be reasonably certain of the cost of wind power for their particular application before they decide to buy a wind energy conversion system (WECS). Such an assessment requires an accurate knowledge of wind characteristics at the turbine site. A procedure is presented for choosing the best available site for a wind turbine. A method for estimating the pertinent wind characteristics once the site is chosen is also described. In some cases, extensive onsite measurements may be required before an accurate analysis of turbine performance can be made. (ERA citation 05:010034)

RLO-2332-3 PC **A08**/MF **A01**
Alaska State Div. of Energy and Power Development, Anchorage.
Development of Procedures for Application During the Public Facilities Procurement Process. Final Report, Phase II Extension. Minimizing Consumption of Exhaustible Energy Resources Through Community Planning and Design.
Feb 79, 163p
Contract EY-76-C-06-2332

Under a project funded by the US DOE, the State of Alaska's Division of Energy and Power Development has conducted a study of energy conservation measures that can be incorporated in public facilities and a new community such as that proposed for the State capital, should it be relocated. As a part of this study, the process by which such facilities are procured was revised to incorporate analysis of energy conservation measures and the control of their incorporation. Supporting procedures were also developed and are included in this report. (ERA citation 05:004704)

RLO-2435-1(V.2) PC **A19**/MF **A01**
Alaska State Div. of Energy and Power Development, Anchorage.
Alaska Regional Energy Resources Planning Project, Phase 1. Volume II. Alaska's Energy Resources: Inventory of Oil, Gas, Coal, Hydroelectric, and Uranium Resources. Final Report.
D. Lane, M. Rahm, and G. Rutledge. Oct 77, 435p
Contract EY-76-C-06-2435

This inventory of energy resources is a first effort at providing a one-source document containing basic information about five energy resources in Alaska: crude oil, natural gas, coal, hydropower, and uranium. In order to give a sense of perspective to each energy resource, the chapters begin with a history of the exploration, development, and production of the resource in Alaska. Methods used to assess and classify each resource are given. Following the background information is the actual resource inventory. Estimates of each resource are provided from a variety of sources. Essential information about the location and quantity, quality (as applicable) and production areas is given. Locations where the resources are found are mapped according to Alaska region. (ERA citation 04:030375)

SAN-1175-T2(V.3) PC **A06**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Energy Use in the Marine Transportation Industry: Task II. Regulations and Tariffs. Final Report, Volume III.
Dec 77, 108p
Contract EY-76-C-03-1175

The evaluation of the energy impacts of regulations and tariffs is structured around three sequential steps: identification of agencies and organizations that impact the commercial marine transportation industry; identification of existing or proposed regulations that were perceived to have a significant energy impact; and quantification of the energy impacts. Following the introductory chapter, Chapter II describes the regulatory structure of the commercial marine transportation industry and includes a description of the role of each organization and the legislative basis for their jurisdiction and an identification of major areas of regulation and those areas that have an energy impact. Chapters III through IX each address one of the 7 existing or proposed regulatory or legislative actions that have an energy impact. Energy impacts of the state of Washington's tanker regulations, of tanker segregated ballast requirements, of inland waterway user charges, of cargo pooling and service rationalization, of the availability of intermodal container transportation services, of capacity limitations at lock and dam 26 on the Mississippi River and the energy implications of the transportation alternatives available for the West Coast crude oil supplies are discussed. (ERA citation 05:003286)

SAND-78-2047C PC **A02**/MF **A01**
Albuquerque Academy, NM.
Specular Reflectance Properties of Solar Mirrors as a Function of Incident Angle.
D. N. Glidden, and R. B. Pettit. 1979, 5p CONF-790541-29
Contract EY-76-C-04-0789
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979, Portions of document are illegible.

The specular reflectance properties of several solar mirror materials have been measured as a function of wavelength, polarization and incident angle. Results for a 3-mm thick, silvered float glass mirror and an aluminized acrylic stretched film are presented. For the silvered glass mirror, measured specular and hemispherical reflectance properties are in excellent agreement with reflectance values calculated from a multiple beam reflectance model. At 65 exp 0 from normal, the average solar reflectance is decreased only approx. 4% from the value at normal incidence. For the aluminized acrylic mirror, measured specular reflectance values at 15 mrad were in agreement with hemispherical reflectance values, while calculated reflectance values are as much as 2% high for one polarization. The average solar reflectance decreases only 2% at an incident angle of 65 exp 0 from normal, while the width of the specular beam increases slightly with incident angle. (ERA citation 04:049774)

SAND-78-8276 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Natural Convection Heat Transfer from an External Receiver.
D. Siebers. Dec 79, 41p
Contract EY-76-C-04-0789

A numerical solution of turbulent, two-dimensional, natural convection heat transfer for a high temperature, vertical surface is presented in this work. This is relevant to heat transfer from the receiver of a solar central receiver power plant on a calm day (no wind). It is the lower bound of convective loss from an external receiver. Application of wall suction to the receiver surface is also examined as a means of reducing convective loss. In the Appendix an analysis of the economic impact of energy loss from a receiver is presented. It demonstrates the importance of receiver performance with regard to solar central receiver plant cost. (ERA citation 05:008301)

SAND-79-0096 MF **A01**
Sandia Labs., Albuquerque, NM.
Problems of Technology Transfer to Industry.
D. M. Mattox. 1979, 15p CONF-790213-1
Contract EY-76-C-04-0789
Energy technology conference and exposition, Washington, DC, USA, 26 Feb 1979.
Microfiche copies only.

The following are discussed: solar energy utilization, technology development, technology transfer, and problems with technology transfer. Examples of technology development and transfer to industry are given. (ERA citation 04:036026)

SAND-79-0190 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Method for Calculating Shadows Cast by Two-Axis Tracking Solar Collectors.
J. K. Linn, and J. C. Zimmerman. Nov 79, 32p
Contract EY-76-C-04-0789

A method is described that quickly calculates the shadows cast from two-axis tracking solar collectors onto adjacent collectors. The solar collectors can have either circular or rectangular apertures. (ERA citation 05:008373)

SAND-79-0800 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
FY78 Annual Progress Report: Midtemperature Component and Subsystem Development Project.
L. M. Larson. Sep 79, 61p
Contract EY-76-C-04-0789

FY78 activities within the Midtemperature Component and Subsystem Development Project that support the DOE Small Power Systems Program are described. Small-power systems are for point-of-use applications of solar energy rather than centralized or public-utility-size applications. The major objectives of this program are to determine areas of research and development that are unique to small-power systems in the mid-temperature range, and to develop technology that will allow initial commercial implementation of small-power systems within the 1980s. The Sandia activities within the Small-Power Systems Program consist of four subprograms: Total Energy, Remote Applications, Midtemperature Component and Subsystem Development, and Midtemperature Solar Systems Test Facility Operation. Some application projects within these subprograms are the solar irrigation projects near Willard, NM and Coolidge, AZ; the Small Community Solar Power Project for Crosbyton, TX; and the STE-LSEs at Fort Hood, TX and Shenandoah, GA. The object of these programs is accelerated commercialization of solar energy systems. This will be done by demonstrating the technical feasibility in applications of large portions of the national energy market and by creating within the private sector the design and manufacturing capabilities for installing such systems. (ERA citation 05:000548)

SAND-79-1293C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Effect of Cleaning Cost on Process Heat from Line-Focus Solar Collectors.
L. L. Lukens, and W. P. Schimmel, Jr. 1979, 10p CONF-791024-1
Contract EY-76-C-04-0789
Solar industrial process heat conference, San Francisco, CA, USA, 31 Oct 1979.

The effect of operation and maintenance (O and M) costs on energy produced by solar collector systems is crucial to the market penetration of solar process heat as an alternative energy source. In the present paper, a particular O and M operation, namely, regular collector cleaning, is considered in order to determine its effect upon annualized life cycle energy cost. A first order model of mirror surface degradation as a function of time is constructed from actual experimental data taken at Albuquerque, NM. This is used as input to a systems optimization model of a line-focus solar collector process heat installation. The energy cost variation is considered as a function of cleaning cost per unit of collector aperture and cleaning interval. Results are presented for a process heat temperature of 177 exp 0 C (350 exp 0 F) and two different time-constant values, with a reflector degradation limit of 13%. This information could help in formulating O and M costs to assume in modeling other generic-type solar collectors. (ERA citation 05:000549)

SAND-79-8181 PC **A07**/MF **A01**
Schumacher and Associates, Inc., Sacramento, CA.
Preliminary Design Report: New Ideas for Heliostat Reflector Cleaning Systems.
J. Schumacher, J. Hansen, and J. Nevenzel. Dec 79, 135p
Contract EY-76-C-04-0789

The feasibility of two new concepts for cleaning heliostat reflectors has been investigated in this program and the results are itemized. In addition, this phase of the program involved the design and construction of a reflectometer and wind tunnel and the performance of some dust accumulation studies, the results of which are also listed. (ERA citation 05:008374)

SAND-79-8248 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Heliostat Design Cost/Performance Tradeoffs.
M. J. Fish, and T. A. Dellin. Nov 79, 50p
Contract EY-76-C-04-0789

The heliostat field comprises the most expensive subsystem of a solar central receiver power plant. Cost reductions might be achieved by either total heliostat redesign or component substitution in existing designs. This paper discusses the value of changing any of several design specifications in the current baseline glass/metal heliostat. Results are quantified in terms of the breakeven cost; i.e., the cost of a new design which will yield the same total system energy cost as the baseline system. Changes in mirror reflectivity, pointing accuracy, surface quality, canting and focusing strategy, heliostat size, and stow requirement are evaluated. (ERA citation 05:008303)

SERI/TP-34-325 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.

End-Use Matching of Solar Energy Systems.
F. Kreith, D. Kearney, and A. Bejan. 1979, 25p
Contract EG-77-C-01-4042

The choice among available energy sources for a given task requires technical and economic tradeoffs on the part of the individual investor. From the national perspective, however, the effectiveness with which available energy sources are utilized may well become an overriding consideration. End-use matching is a procedure for introducing solar energy into the national energy infrastructure. The result of end-use matching is an identification of the most cost-effective combination of process energy needs, solar collector technology, geographic location, and economics by matching currently available solar system hardware with particular industrial processes and their locations. End-use matching is not intended to be a design tool for a specific plant, but rather a planning tool for determining where and for what general applications solar systems appear economically viable in the near- to immediate-term. This paper discusses the end-use matching methodology and illustrates first and second law thermodynamics analyses applied to a solar system producing process steam. (ERA citation 05:002849)

SERI/TP-53-123 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Energy Commercialization and the Labor Market.
B. Mason, G. Ferris, and B. Burns. 1978, 30p
CONF-781235-4
Contract EG-77-C-01-4042
Symposium on commercialization of solar and conservation technologies, Miami Beach, FL, USA, 11 Dec 1978.

The success of a new technology does not depend only on its technical and economic feasibility. Evidence from the diffusion of non-solar technologies suggests that unless the product can be accepted and integrated into existing institutional processes and practices and can meet specific user and technology delivery system requirements, acceptance and diffusion of the technology will be slow. This paper discusses the potential impacts of solar energy commercialization on labor demand, and conversely, the potential impacts of the labor supply system on solar energy commercialization. Various participants in manpower training programs are examined, and alternative implementation channels to meet the labor needs of an emerging technology are discussed. (ERA citation 04:038367)

SERI/TR-333-462 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Long-Term Average Performance Benefits of Parabolic Trough Improvements.
R. Gee, H. Gaul, D. Kearney, and A. Rabl. Oct 79, 7p CONF-791024-8
Contract EG-77-C-01-4042
Solar industrial process heat conference, San Francisco, CA, USA, 31 Oct 1979.

Improved parabolic trough concentrating collectors will result from better design, improved fabrication techniques, and the development and utilization of improved materials. This analysis quantifies the relative merit of various technological advancements in improving the long-term average performance of parabolic trough concentrating collectors and presents them graphically as a function of operating temperature for north-south, east-west, and polar mounted parabolic troughs. Substantial annual energy gains (exceeding 50% at 350 exp 0 C) are shown to be attainable with improved parabolic troughs. (ERA citation 05:006787)

SERI/TR-34-083 PC **A07**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Survey of Solar Thermal Test Facilities.
K. Masterson. Aug 79, 127p
Contract EG-77-C-01-4042

The facilities that are presently available for testing solar thermal energy collection and conversion systems are briefly described. Facilities that are known to meet ASHRAE standard 93-77 for testing flat-plate collectors are listed. The DOE programs and test needs for distributed concentrating collectors are identified. Existing and planned facilities that meet these needs are described and continued support for most of them is recommended. The needs and facilities that are suitable for testing components of central receiver systems, several of which are located overseas, are identified. The central contact point for obtaining additional details and test procedures for these facilities is the Solar Thermal Test Facilities Users' Association in Albuquerque, N.M. The appendices contain data sheets and tables which give additional details on the technical capabilities of each facility. Also included is the 1975 Aerospace Corporation report on test facilities that is frequently referenced in the present work. (ERA citation 05:002867)

SERI/TR-34-092 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Optical Analysis and Optimization of Line Focus Solar Collectors.
P. Bendt, A. Rabl, H. W. Gaul, and K. A. Reed.
Sep 79, 73p
Contract EG-77-C-01-4042

The optical analysis of a solar concentrator is usually carried out by means of a computer ray tracing, a microscopic method that provides an enormous amount of detailed information but obscures functional relationships. This paper describes a macroscopic approach that yields all the parameters needed for the optical design of line focus parabolic troughs in closed analytical form, requiring only minimal computation. The goal of the optical analysis is to determine the flux at the receiver as a function of concentrator configuration, receiver size, width of sun, and optical errors (e.g., tracking, reflector contour). All causes of image spreading are quantified as angular standard deviation. Ray tracing with a real reflector and a real sun is shown to be equivalent to convoluting the angular acceptance function of a perfect concentrator with an effective radiation source. This effective source, in turn, is obtained by convoluting the distribution function of optical errors with the angular profile of the sun. The problem is reduced to two dimensions by projecting the three-dimensional motion of the sun on the plane normal to the tracking axis. In this frame the apparent width of the sun increases as 1/cos THETA with incidence angle THETA. A formula and a simple graphical procedure are provided for finding the optimal geometric concentration ratio, maximizing net power output. In the last section, which is written as a self-contained users guide, the results are illustrated by specific examples. (ERA citation 05:006786)

SERI/TR-53-155 PC **A19**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Public Opinion About Energy: A Literature Review.
B. C. Farhar, P. Weis, C. T. Unseld, and B. A. Burns. Jun 79, 450p
Contract EG-77-C-01-4042

A review and analysis of 115 surveys of the general population between 1973 and 1978 (before the Three Mile Island accident, sudden gasoline price increases, and spot gasoline shortages) are presented. The survey data are organized and analyzed according to a set of categories described in Chapter 2. The public's definition of the energy situation is the focus of Chapter 3. Chapter 4 describes public opinion concerning energy conservation pertaining to transportation and domestic energy use -- whether it is efficacious, how knowledgeable people are about conservation, whether they favor it, and whether they engage in it. Findings on the solar energy alternative are described in Chapter 5. Public opinion concerning more conventional sources of energy -- oil and natural gas, coal, and nuclear energy -- are discussed in Chapter 6. In Chapter 7, a summary of analytical findings by 10 major sociodemographic characteristics is presented. Chapter 8 describes analytical findings using various social-psychological variables. A summary is presented in Chapter 9. (ERA citation 05:005814)

SIB-R-16-1979 PC **A02**/MF **A01**
Statens Inst. foer Byggnadsforskning, Stockholm (Sweden).
Group of Houses at Esloev, Sweden, Used for a Pilot Study of Municipal Engineering and Energy Conservation.
P. Broberg, and K. Johansson. 1979, 16p
In Swedish.
U.S. Sales Only.

An area at Esloev, Sweden, including 79 villas, a school, a day nursery and shops, was chosen for a pilot study of an experimental group of houses, for which more advanced systems for energy conservation have been introduced. The project is part of a necessary social effort to economize with all public resources. There is a need to decrease the demand of energy and try to decrease the costs for both investment and operation when building in the future. (ERA citation 04:056831)

SRC-7017-1 PC **A06**/MF **A01**
Synergic Resources Corp., Bala-Cynwyd, PA.
Ozarks Regional Commission Lignite Research Agenda. Final Report.
May 79, 113p

The Ozarks Regional Commission (ORC), following up on the recommendations of its Regional Energy Alternatives Study, conducted a Lignite Conference in May 1978 to bring together knowledgeable and interested parties to discuss the opportunities and constraints for lignite development. This conference focused public attention on the potential benefits and impacts of lignite development in Arkansas and Louisiana, and identified the need for additional information regarding the lignite resource base, characteristics, utilization potential and developmental impacts. ORC therefore commissioned this study to generate a Lignite Research Agenda. The principal objective of this project was to develop a Lignite Research Agenda to be undertaken by the public sector to establish a concerted regional effort of balanced and orderly development of the lignite resources in Arkansas and Louisiana. The research agenda addresses the following areas: Lignite resource base, technologies for conversion/utilization, market potential for lignite, environmental impacts of lignite, socio-economic impacts of lignite, regulatory and institutional factors, and information dissemination. The summarized research agenda includes a definition of: Prioritization of research areas, research objectives and potential benefits, definition of research programs, identification of specific projects, schedule, funding requirements, and cofunding possibilities and relationship to other existing research programs. (ERA citation 05:002438)

SRC-7017-2 PC **A03**/MF **A01**
Synergic Resources Corp., Bala-Cynwyd, PA.
Socio-Economic Implications of Lignite Development. Final Report.
D. R. Limaye, and D. M. White. Apr 79, 38p

This working paper addresses the socio-economic implications of lignite development in the rural areas of Arkansas and Louisiana. It draws upon the experience with lignite development in Texas as well as the coal and lignite development in the West. The general implications of lignite development are identified and discussed and are illustrated with a case study of Mt. Pleasant, Texas. Requirements for future research relevant to Arkansas and Louisiana are identified. (ERA citation 05:002482)

SRC-7017-5 PC **A02**/MF **A01**
Synergic Resources Corp., Bala-Cynwyd, PA.
Potential Industrial Markets for Lignite.
D. R. Limaye, and D. M. White. Apr 79, 23p

This working paper addresses the major factors influencing the potential utilization of lignite as an industrial fuel in Arkansas and Louisiana. The technical, economic and regulatory aspects of industrial markets for lignite are reviewed and a brief discussion of the potential of lignite use in the industrial belt in southern Louisiana as well as for existing and new industry in the lignite region in Arkansas and Louisiana, is presented. This paper was prepared in support of the development of the Lignite Research Agenda for the Ozarks Regional Commission. During the development of the Agenda, Synergic Resources Corporation personnel worked in close cooperation with an under the supervision of the Lignite Steering Committee. Members of this Steering Committee included representatives of the local economic development districts, the two state energy offices, state geological surveys and Commission staff. (ERA citation 05:002480)

TID-28840(Dr) PC **A05**/MF **A01**
Department of Energy, Washington, DC.
Commercialization Strategy Report for Hydrothermal Electric and Direct Heat Application.
R. A. Black, J. V. Dionne, L. Falick, and E. B. Harvey. 100p

Hydrothermal geothermal resources are reservoirs at moderate depths (generally 2000 to 7000 feet) containing steam and/or hot water under pressure at temperatures up to about 350 exp 0 C. The use of vapor-dominated hydrothermal resources for production of electric power is a proven technology. Approximately one-third of the current world installed electric capacity of 1400 MW is produced from liquid-dominated resources; the balance is produced from the more-easily-exploited vapor-dominated reservoirs. The ability to handle high-temperature, low-to-moderate-salinity geofluids and convert the heat to usable power using existing technology has been demonstrated, but the use of high-temperature, high-salinity brines and moderate-temperature resources will require advanced and unproven energy-conversion systems for economic operation. Although the technical feasibility of using geothermal energy for direct thermal applications has been shown worldwide, use by the private sector within the US has been small. Commercial use in the US to date has been principally restricted to residences, small commercial buildings, and milk pasteurization in Oregon, a small district-heating system in Idaho, and scattered agribusiness, swimming pool heating, and other miscellaneous applications in the western US. Technical risks and environmental acceptability are discussed along with technical, market/economic, environmental, and institutional readiness and benefit analysis. A commercialization plan for hydrothermal electric and direct heat applications is presented. (ERA citation 04:046839)

TMVK-3067 PC **A03**/MF **A01**
Lund Inst. of Tech. (Sweden). Inst. foer Vaermeoch Kraftteknik.
Progress Report from the Division of Heat and Power Engineering at Lund Institute of Technology, Sweden, 1975-1977.
T. Torisson. Jun 78, 30p
In Swedish.
U.S. Sales Only.

An account is given for the research activities at the Division of Heat and Power Engineering at Lund Institute of Technology, Sweden, during the period 1975 to 1977. At this division, methods and systems which are important when converting raw energy to refined energy forms in simple or combined processes, are studied. (ERA citation 05:002923)

UCID-18291 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Limits on Oil Conservation in the US Transportation Sector.
A. L. Austin. 3 Oct 79, 29p
Contract W-7405-ENG-48

Conservation measures in the transportation sector are expected to significantly reduce oil consumption to help meet the national goal to reduce oil imports by about 4 million bbl/day (MBD) by 1990. These measures include increased carpooling, increased use of mass transit, enforced 55-mph speed limit, and the introduction of more fuel-efficient autos. This paper attempts to quantify the effectiveness of each. Increased carpooling and mass transit, by themselves, are inadequate conservation measures. The key to transportation energy conservation is the introduction of the efficient auto. However, because of the difference between EPA-tested new car mileage and that obtained under actual driving conditions, it is unlikely that oil consumption will reduce as expected. It is estimated that, at best, we can expect only a 1.8 to 2.7-MBD oil savings in 1990 - a considerable shortfall. (ERA citation 05:008782)

UCRL-83469 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
WATER-EPM: The Incorporation of Water into an Energy Policy Model.
M. D. Schrot. 12 Oct 79, 30p CONF-791043-4
TIMS/ORSA national meeting, Milwaukee, WI, USA, 15 Oct 1979.

Significant amounts of water are consumed as energy is transported from resource regions and processed into gasoline, electric power, etc., available for end-use in a demand region. Indeed, particularly in certain regions, water, even more than energy-resource materials such as coal, gas, or uranium, may eventually constitute a prime constraint on the energy available for end-use. Models designed to forecast energy supply and demand generally do not consider water resources explicitly. This paper addresses the feasibility and usefulness of integrating water into a particular model. The Lawrence Livermore Lab. Energy Policy Model (EPM) is a regionalized, dynamic equilibium model that represents the production, processing, and transport of energy from resource extraction to end-use. This paper consists of a simplified look at the workings of the modeling system underlying the EPM, an overview of the EPM itself, a description of the manner of incorporating water into this model to form WATER-EPM, and a brief discussion of the issues that can be investigated using this augmented model. (ERA citation 05:003190)

10B. Power Sources

AD-A086 506/3 PC **A12**/MF **A01**
IIT Research Inst Chicago IL
Navy-New Hampshire Wind Energy Program.
Final rept. 4 Jun-31 Oct 79,
S. A. Bortz, R. A. Budenholzer, R. D. Carlson, I. Fieldhouse, and J. Kornfeld. Nov 79, 251p Rept no. IITRI-M6052
Contract N00014-79-C-6503
Supersedes Rept. no. IITRI-D6169.

This program investigated the potential of the Mt. Washington, New Hampshire area for generating electric power from wind energy as an alternative to fossil fuels. The U.S. Naval Shipyard at Portsmouth, New Hampshire is among those facilities which could benefit initially from successful wind generated power. IIT Research Institute (IITRI) specialists performed the following tasks: (1) Evaluation of New Hampshire's wind energy resources for potential electric power generation using meteorological, topographical, biological and other available information, (2) Assessment of the environmental, social, technical, and other possible barriers to the development of wind energy resources, and (3) Economic evaluation of installing one or more wind turbine-generators to supply power either directly to the Shipyard or to lines of the Public Service Company of New Hampshire which supplies the Shipyard.

AD-A086 549/3 PC **A05**/MF **A01**
MITRE Corp Bedford MA
General Electric Unattended Power System Study. Addendum.
Technical rept.,
D. D. Bregenzer. May 80, 91p MTR-3844-ADD, ESD-TR-80-124
Contract F19628-79-C-0001

The General Electric 2 KW(e) Unattended Power System Study was conducted in 1976-77 to analyze the cost and risk associated with the development of alternative power systems capable of supplying 2 KW(e) in an unattended mode in an Arctic environment. The study concluded that a diesel power system was the most attractive alternative for an unattended radar (UAR) station prime power generation and distribution system. This paper extends the General Electric Study by examining three of the candidate systems in more detail and updating cost estimates based on a change in the power requirements to 5KW(e). The three systems chosen for further examination are diesel power systems, fuel cell power plants, and an organic Rankine cycle turbogenerator, the Ormat Energy Converter. (Author)

AD-A086 579/0 PC **A03**/MF **A01**
Energy Research Corp Danbury CT
Aqueous Trifluoromethanesulfonic Acid Fuel Cells.
Interim technical progress rept. Jun 78-Aug 79,
Michael George. Dec 79, 47p Rept no. ERC-6154-I
Contract DAAK70-78-C-0103

Subscale hydrogen-air fuel cells were successfully operated with 6M TFMSA as the electrolyte at temperatures as high as 60 C. The fuel cell performance was enhanced over similarly loaded electrodes in H3PO4 due to the apparent improved kinetics for the oxygen reduction reaction. A variety of unsupported and supported Pt electrocatalysts could be effectively utilized. TFMSA fuel cells could be operated stably for periods as long as 3000 hours if water balance was maintained. Activity coefficients calculated by the van Laar equations were utilized to predict water partial pressures of dilute TFMSA solutions. (Author)

AED-Conf-78-155-017 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Increased Productivity in Power Plants by the Computer-Based Information System PRAUT.
P. Hanbaba. 1978, 25p CONF-7804102-28
In German.Systems exhibition energy within the context of the Hannover fair, Hannover, F.R. Germany, 19 Apr 1978.
U.S. Sales Only.

Decrease of commissioning times, reduction of shut-down periods, avoiding of power reductions, fast adaption to load requirement variations act in the direction of increasing the productivity of a power plant. An essential contribution to this is provided by harmonized control, monitoring and communications concepts as realized, e.g. in the PRO-CONTROL system by Brown Boveri. (Atomindex citation 09:414921)

BF-R-62.530-200/1 PC **A03**/MF **A01**
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).
Investigations of the Technical, Organisational, and Social Preconditions for Risk Strategies in the Field of Technological Development. Intermediate Report 200/1: Comparing the Health Risk Connected with Different Electric Power Generation Technologies.
B. Oberbacher, S. Hartwig, and R. Hintz. 1976, 45p
In German.
U.S. Sales Only.

The risks of technology should be weighed against its benefits. On the basis of this statement, the technical risks, i.e. the danger to man and its environment, connected with electric power generation on the bais of coal, heating fuel oil, gas, water, and nuclear energy are analysed over all stages of production and waste management. The health risk is divided up into risks inside the works and the general risk affecting the environment of the works. In raw materials winning, the risk encountered can usually be assessed. Raw materials processing, transport of primary energy carriers, and electric power generation are fields which endanger also the outside population. The health risk to those working in the whole production and waste mangement process has been determined from accident statistics. The health risk to the outside population has been derived from the material balance and the potential dangers of the single process stages. Disasters such as explosion or similar occurences in conventional electric power generation play a minor role as far as hazards to the population are concerned. The main factor here are continuous emissions of noxious substances during normal operation, whose effects on the population are hard to assess. The dangers of nuclear power have been estimated on a tentative basis only, due to the relatively little operational experience and knowledge. In the course of the work so far, it has been attempted to give as broad a survey as possible on the risk problem in electric power generation. The amount of physical injuries to be expected in power generation on the basis of the different energy carriers has been determined on the basis of statistical data and is given in a table. (Atomindex citation 09:391886)

BF-R-62.530-300/1 PC **A05**/MF **A01**
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).

Investigations of the Technical, Organisational, and Social Preconditions for Risk Strategies in the Field of Technological Development. Intermediate Report 300/1: Environmental Pollution Due to Electric Power Generation on the Basis of Coal, Heating Fuel Oil, and Nuclear Energy.
B. Oberbacher, R. Guenther, and S. Hartwig.
1976, 96p
In German.
U.S. Sales Only.

For a picture of environmental pollution due to electric power generation on the basis of coal (hard coal), petroleum (heavy fuel), and uranium are (uranium oxide), the thermal pollution and the pollution by noxious substances which might induce a health risk have been determined for all process steps with the aid of measured data of technical facilities and expected values for the process steps in the nuclear fuel cycle which have not been realized so far. On the basis of the present knowledge, an assessment of the possible effects of this types of pollution has been attempted (thermal pollution, air and water pollution, pollution due to waste). (Atomindex citation 09:391887)

IJS-106/5019-77 MF **A01**
Institut Jozef Stefan, Ljubljana (Yugoslavia).
Cooling Methods for Power Plants.
B. Gaspersic, L. Fabjan, and S. Petelin. 1977, 84p
In Slovenian.
U.S. Sales Only. Microfiche copies only.

There are some results of measurements carried out on the wet cooling tower 275 MW(e) at TE Sostanj and on the experimental cooling tower at Jozef Stefan Institute, as well. They are including: the measurements of the output air conditions, the measurements of the cross current of water film and vapour-air flowing through two plates, and the distribution of velocity in boundary layer measured by anemometer. (Atomindex citation 10:423837)

INIS-mf-5425 PC **A05**/MF **A01**
Indian Inst. of Tech., Bombay.
Research Report on a Study in MHD Power Generators - End Effects.
M. L. Mittal. 99p
U.S. Sales Only.

In MHD devices, there are significant losses due to end effects, boundary layers and instabilities. The present investigations concern the estimation of losses due to end effects. The basic equations and boundary conditions for the analysis of end effects are derived. Using a sinusoidal and exponential termination, at the entrance region of a rectangular MHD channel with continuous electrodes, the end effect phenomenon is analysed. The normal current density on the electrode walls, is examined and the effects of the Hall currents on end losses is discussed. The end effects with diverging electrode walls are also investigated. The normal current distribution on the electrodes and the efficiency are calculated for two different velocity profiles - one with viscosity and the other with source velocity. (Atomindex citation 11:501291)

Juel-1573 PC **A08**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung.
Applied Systems Analysis No. 11: Introduction of Nuclear Long-Distance Energy. Environmental Impact and Its Assessment.
J. Bartholdi. Jan 79, 155p
In German.Thesis.
U.S. Sales Only.

The process of planning for the introduction of new energy technologies requires, together with economic and technical analyses, the quantification and evaluation of the environmental effects of their introduction. It is the goal of this work to determine the environmental impact of individual components of the energy system 'nuclear long distance energy' and to investigate the possible protection of the environment which the energy technology can offer on a regional basis. Results for four areas of environmental damage in North Rhine-Westphalia, Hessen and Rhineland-Pfalz show that nuclear long distance energy can yield a positive benefit to the environment. (Atomindex citation 10:470689)

NP-23506 PC **A11**/MF **A01**
Cologne Univ. (Germany, F.R.). Energiewirtschaftliches Inst.
Parameter Study to Determine Electric Power Generation Costs.
D. Schmitt, H. Junk, K. F. Ebersbach, and H. Prechtl. Sep 77, 240p
In German.Portions of document are illegible.
U.S. Sales Only.

Calculations are made of actual costs of electric power generation. Cost structures of existing power plants as well as those put into operation in the mid-1980s are examined. The influence of various parameters on the cost of electric power generation is determined. The investigation is limited to the alternatives nuclear power and hard coal, which are the most important for the future power generation. (ERA citation 04:026803)

NP-23920 PC **A05**/MF **A01**
California Energy Commission, Sacramento.
Inventory of Underground Energy Storage Sites in California.
Oct 78, 89p

This report provides information on potential underground energy storage sites in California. Most of this data was collected as part of an investigation of the feasibility of underground storage of compressed air for electricity generation, but many of the sites identified may be equally or better suited to other energy storage applications at a variety of sizes. Six types of potential storage sites in California are included in the data sheets of this report: gas fields, oil fields, saline aquifers, hard rock sites for the excavation of new reservoirs, caves, and abandoned mines. The information for each site, as appropriate for a given site type, includes the site name, location (county, city, USGS quadrangle), depth to storage medium, volume, rock type, rock thickness, permeability, porosity, pressure containment capability, and distance to transmission facilities, pipelines, and geologic hazards. The voltage of the nearest transmission line or substation is also indicated for each type of site, based on the map, Electric Generating Stations, Transmission Lines and Interconnecting Systems, 1967, compiled by the California Public Utilities Commission. Each type of storage site and the methods for obtaining data specific to each site type are described. (ERA citation 04:056756)

N80-27799/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Engineering Test Facility Design Definition.
R. W. Bercaw, and G. R. Seikel. 20 Jun 80, 16p NASA-TM-81499, DOE/NASA/2674-11
Contract EF-77-A-01-2674
Presented at 7TH Intern. Conf. On Magnetohydrodynamic Elect. Power Generation, Cambridge, Mass., 16-20 Jun. 1980; Sponsored by Symp. On the Eng. Aspects of Magnetohydrodynamics, Inc.

The Engineering Test Facility (ETF) is the major focus of the Department of Energy (DOE) Magnetohydrodynamics (MHD) Program to facilitie commercialization and to demonstrate the commercial operability of MHD/steam electric power. The ETF will be a fully integrated commercial prototype MHD power plant with a nominal output of 200 MW sub e. Performance of this plant is expected to meet or surpass existing utility standards for fuel, maintenance, and operating costs; plant availability; load following; safety; and durability. It is expected to meet all applicable environmental regulations. The current design concept conforming to the general definition, the basis for its selection, and the process which will be followed in further defining and updating the conceptual design.

N80-27801/3 PC **A04**/MF **A01**
General Electric Co., Wilmington, MA. Aircraft Equipment Div.
Solid Polymer Electrolyte Fuel Cell Technology Program.
Final Report.
31 May 80, 53p NASA-CR-160734, TPR-77
Contract NAS9-15286

Work is reported on phase 5 of the Solid Polymer Electrolyte (SPE) Fuel Cell Technology Development program. The SPE fuel cell life and performance was established at temperatures, pressures, and current densities significantly higher than those previously demonstrated in sub-scale hardware. Operation of single-cell Buildup No. 1 to establish life capabilities of the full-scale hardware was continued. A multi-cell full-scale unit (Buildup No. 2) was designed, fabricated, and test evaluated laying the groundwork for the construction of a reactor stack. A reactor stack was then designed, fabricated, and successfully test-evaluated to demonstrate the readiness of SPE fuel cell technology for future space applications.

N80-27803/9 PC **A04**/MF **A01**
Wichita State Univ., KS.
Feasibility Study of Aileron and Spoiler Control Systems for Large Horizontal Axis Wind Turbines.
Final Report.
W. H. Wentz, Jr., M. H. Snyder, and J. T. Calhoun. May 80, 69p NASA-CR-159856, DOE/NASA/3277-1
Grant NSG-3277, Contract EX-76-I-01-1028

The feasibility of using aileron or spoiler controls as alternates to pitch control for large horizontal axis wind turbines was studied. The NASA Mod-0 100 kw machine was used as the basis for the study. Specific performance studies were conducted for 20% chord ailerons over the outboard 30% span, and for 10% chord spoilers over the same portion of the span. Both control systems utilized control deflections up to 60 deg. Results of the study show that either ailerons or spoilers can provide the control necessary to limit turbine power in high wind conditions. The aileron system, as designed, provides overspeed protection at hurricane wind speeds, low wind speed starting torque of 778 N-m (574 ft. lb) at 3.6 m/sec, and a 1.3 to 1.5% increase in annual energy compared to a fixed pitch rotor. The aileron control system preliminary design study includes aileron loads analysis and the design of a failsafe flyweight actuator for overspeed protection in the event of a hydraulic system failure.

N80-27804/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effect on Combined Cycle Efficiency of Stack Gas Temperature Constraints to Avoid Acid Corrosion.
Final Report.
J. J. Nainiger. Jul 80, 16p NASA-TM-81531, DOE/NASA/2593-17
Contract EF-77-A-01-2593

To avoid condensation of sulfuric acid in the gas turbine exhaust when burning fuel oils containing sulfur, the exhaust stack temperature and cold-end heat exchanger surfaces must be kept above the condensation temperature. Raising the exhaust stack temperature, however, results in lower combined cycle efficiency compared to that achievable by a combined cycle burning a sulfur-free fuel. The maximum difference in efficiency between the use of sulfur-free and fuels containing 0.8 percent sulfur is found to be less than one percentage point. The effect of using a ceramic thermal barrier coating (TBC) and a fuel containing sulfur is also evaluated. The combined-cycle efficiency gain using a TBC with a fuel containing sulfur compared to a sulfur-free fuel without TBC is 0.6 to 1.0 percentage points with air-cooled gas turbines and 1.6 to 1.8 percentage points with water-cooled gas turbines.

N80-27808/8 PC **A04**/MF **A01**
Spectrolab, Inc., Sylmar, CA.
Screen Printing Technology Applied to Silicon Solar Cell Fabrication.
Final Report, Nov. 1977 - Feb. 1979.
J. W. Thornhill, and W. E. Sipperly. Apr 80, 64p NASA-CR-159789
Contract NAS3-20826

The process for producing space qualified solar cells in both the conventional and wraparound configuration using screen printing techniques was investigated. Process modifications were chosen that could be easily automated or mechanized. Work was accomplished to optimize the tradeoffs associated with gridline spacing, gridline definition and junction depth. An extensive search for possible front contact metallization was completed. The

back surface field structures along with the screen printed back contacts were optimized to produce open circuit voltages of at least an average of 600 millivolts. After all intended modifications on the process sequence were accomplished, the cells were exhaustively tested. Electrical tests at AMO and 28 C were made before and after boiling water immersion, thermal shock, and storage under conditions of high temperature and high humidity.

N80-27809/6 PC **A04**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Power Satellite System Definition Study. Volume 1: Executive Summary, Phase 3.
Final Report, Dec. 1979 - May 1980.
Jun 80, 69p NASA-CR-160742, D180-25969-1-V-1
Contract NAS9-15636
5.

Results of a three phase study of the Solar Power Satellite System are summarized. Various options and alternate systems were considered and the following conslusions were reached: antenna mounted solid state transmitters are potentially as cost effective as the klystron approach, although limited to 2500 megawatts net output; the free electron laser and optical diode laser appear most promising for laser power transmission; ground antenna siting need not be restricted to below 35 degrees of latitude; and nonrecurring cost reductions attainable by using a smaller Heavy Lift Launch Vehicle are highly attractive.

N80-27810/4 PC **A18**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Power Satellite System Definition Study. Volume 2, Part 3: Final Briefing, 16 May 1980, Phase 3.
Jun 80, 410p NASA-CR-160743, D180-25969-2-V-2
Contract NAS9-15636

Alternatives to the microwave transmission system previously defined Solar Power Satellite Systems were investigated. These were the laser power transmission, transportation systems, and an analysis or solid state power transmission. The advantages of each system are presented.

N80-27811/2 PC **A05**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Power Satellite System Definition Study. Volume 3: Laser SPS Analysis, Phase 3.
Final Report, Dec. 1979 - May 1980.
Jun 80, 99p NASA-CR-160744, D180-25969-3-V-3
Contract NAS9-15636
5.

The potential use of lasers for transmitting power to Earth from Solar Power Satellites was examined. Free electron lasers appear most promising and would have some benefits over microwave power transmission. Further research in laser technology is needed.

N80-27812/0 PC **A05**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Power Satellite System Definition Study. Volume 4: Solid States SPS Analysis, Phase 3.
Final Report, Dec. 1979 - May 1980.
Jun 80, 79p NASA-CR-160745, D180-25969-4-V-4
Contract NAS9-15636
5.

A 2500 megawatt solid ground output Solar Power Satellite (SPS) of conventional configuration was designed and analyzed. Because the power per receiving antenna is halved, as compared with the klystron reference, twice the number of receiving antennas are needed to deliver the same total power. The solid state approach appears feasible with a slightly greater specific mass and slightly higher cost than the klystron SPS design.

N80-27813/8 PC **A08**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Power Satellite System Definition Study. Volume 5: Space Transportation Analysis, Phase 3.
Final Report, Dec. 1979 - May 1980.
Jun 80, 153p NASA-CR-160746, D180-25969-5-V-5
Contract NAS9-15636
5.

A small Heavy Lift Launch Vehicle (HLLV) for the Solar Power Satellites (SPS) System was analyzed. It is recommended that the small HLLV with a payload of 120 metric tons be adopted as the SPS launch vehicle. The reference HLLV, a shuttle-derived option with a payload of 400 metric tons, should serve as a backup and be examined further after initial flight experience. The electric orbit transfer vehicle should be retained as the reference orbit-to-orbit cargo system.

PB80-208606 PC **A04**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Prediction of Noise Impacts by the Proposed Vienna Unit No. 9.
Mary Cwiklewski. Feb 80, 75p PPSP/JHU/PPSE-8-2

Noise predictions are presented for a proposed 600 MWE expansion of a power plant at Vienna, Maryland. Topics include ambient noise, continuous and non-continuous plant noise sources, propagation of noise to off-site areas, annoyance potential, compliance with state noise regulation, and predictions of traffic noise from the proposed rerouting of an adjacent highway.

PNL-SA-7949 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Economics of Thermal Energy Storage for Compressed Air Energy Storage Systems.
S. C. Schulte. Aug 79, 8p
Contract EY-76-C-06-1830

The costs of compressed air energy storage (CAES) systems utilizing thermal energy storage are compared with the costs of conventional CAES systems and combustion gas turbine systems. Comparisons are made on the basis of system energy cost levelized over system operating lifetime (mills/kWh). The comparison was performed by Pacific Northwest Laboratory for the Department of Energy using information from reference studies by the Massachusetts Institute of Technology, Central Electricity Generating Board and Knutsen Research Services. System energy costs were estimated using information from three reference CAES/thermal energy storage studies, a recent PNL research effort, and the EPRI Technical Assessment Guide. Capital investment cost estimates and system operating requirements were obtained from the reference studies. Current turbine fuel and compression energy prices were obtained from a July 1979 PNL research effort. Economic and financial input assumptions and a discounted cash flow-required revenue computational methodology were taken from the Technical Assessment Guide. Use of such a normalization procedure results in system energy cost estimates that are both realistic and comparable. Two principal conclusions resulted from the study. First, given today's fuel prices and the expected fuel prices in the 1980's, conventional CAES systems yield lower energy cost estimates than combustion gas turbine systems. Second, thermal energy system storage/adiabatic CAES systems yield equivalent and, in some instances, slightly lower energy cost estimates than conventional CAES systems while requiring considerably less turbine fuel oil. (ERA citation 05:005793)

PNL-2746 PC **A11**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Augmented Dry Cooling Surface Test Program: Analysis and Experimental Results.
H. L. Parry, L. J. MacGowan, D. K. Kreid, L. E. Wiles, and D. W. Faletti. Sep 79, 244p
Contract EY-76-C-06-1830

Experiments were performed to assess the operating characteristics and potential performance of water-augmented dry cooling systems. The work was aimed at evaluating a deluged air-cooled HOETERV plate fin heat exchanger surface proposed for integrated dry/wet cooling systems and using test results to guide the development of a predictive analytical model. In the process, all-dry performance data were obtained for the HOETERV surface as well as for two Curtiss-Wright chipped fin surfaces. The dry heat transfer data indicate that a slotted Curtiss-Wright surface slightly outperforms the HOETERV and nonslotted Curtiss-Wright surfaces based on heat rejection rate per unit of fan power. However, all three surfaces are so close in performance that other factors, such as surface cost and piping and mounting costs, will probably determine which surface is preferred at a given installation. Comparisons of deluged HOETERV performance with dry HOETERV and Curtiss-Wright performance under prototypic conditions have established that deluging can provide considerable heat rejection enhancement, particularly at low ITD and low air humidity. A deluged HOETERV core operating at a 115 exp 0 F primary fluid temperature in 105 exp 0 F air at 10% relative humidity can reject over 7 times as much heat as a dry HOETERV core operating under the same conditions at the same air-side pressure drop. Deluged tests were performed to evaluate the effect of airflow rate, deluge flow rate and core tilt angle on performance. Both increased airflow and increased deluge flow increase both heat rejection rate and required fan power. Optimal airflow rate will thus be determined for a given location by the competing costs of heat exchanger surface area versus fan operation. Changes in core tilt angle from vertical to 16 exp 0 from vertical have a negligible effect on performance. (ERA citation 05:004469)

RFP-2992/3533/79-3 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Millville Wind Turbine Generator: Failure Analysis and Corrective Design Modification.
C. A. Waldon, M. J. Carr, and V. K. Grotzky. Jul 79, 25p
Contract EY-76-C-04-3533

Fatigue cracks in the blade skins of the Millville Wind Turbine Generator were fractographically analyzed. It is believed they were caused by large flapwise deflections during a wind storm on December 4, 1978. The deflections caused the skin to buckle, which initiated rapidly growing fatigue cracks. Propagation continued to the leading edge, moving radially inward and outward along the leading edge radius. Communication between Rockwell and Millville resulted in a modified blade design which incorporates several corrective techniques. (ERA citation 05:010033)

RLO-2446-T1 PC **A04**/MF **A01**
Sigma Research, Inc., Richland, WA.
Compatibility Studies for the System Water-Ammonia-Titanium as Related to Ocean Thermal Energy Conversion.
P. C. Owzarski, E. W. Saaski, and T. R. Beck. Dec 77, 62p
Contract EY-77-C-06-2446

Materials for the heat exchangers in OTEC plants must be able to withstand a normally hostile marine environment on the seawater side and a nonaqueous working fluid on the evaporator side. Since titanium normally has shown outstanding corrosion resistance to seawater, and since ammonia appears to be the chosen OTEC working fluid, serious consideration has to be given to the compatibility of titanium to the two environments and to combinations of the two: mixtures of seawater in ammonia and ammonia in seawater, both mixtures being possible because of heat exchanger leaks. Due to a paucity of data for titanium corrosion in these mixtures, this project was initiated to fill part of the knowledge gap. Probably the most insidious and catastrophic corrosion failures are caused by stress corrosion cracking (SCC), a corrosion-accelerated crack propagation in metals under tensile stress. Therefore, the primary purpose of this work was to investigate the susceptibility of titanium to SCC in liquid ammonia and liquid containing small amounts of seawater. The objectives of the experimental project were to determine the effects of liquid ammonia/water/seawater mixtures on titanium specimen tensile failure. These effects were quantified in four ways: (1) percent elongation at failures; (2) percent reduction in area at failure; (3) electrode (specimen) potential versus elongation; and (4) microscopic measurement of secondary cracks (if any) in fractured specimens. The methodology consisted of subjecting a 1/8" diameter CP-titanium (Grade 4) rod immersed in the liquid ammonia solution to a slow tensile strain rate of 10 exp -6 mm/mm s. Results are presented in detail. (ERA citation 05:008312)

SAN-0959-T1 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Progress Report No. 31 for a Program of Thermoelectric Generator Testing and RTG Degradation Mechanisms Evaluation.
G. Stapfer, and L. Garvey. Jul 79, 62p
Contract EY-76-A-03-0959
Portions of document are illegible.

Thermal conductivity measurements of the p-type and n-type selenide alloys after 19,800 hours and 6,500 hours, respectively, continue to show good agreement with the 3M Co. published data. Ingradient testing of n-legs after 8900 hours show comparable performance to the reported 3M data. Ingradient testing of p-legs at accelerated test conditions has completed 5432 hours and performance shows reasonable correlation with accelerated temperature and current gradients. This test has been discontinued to accommodate ingradient performance testing of the new design p-type legs with the Astroquartz/slurry wrap. Weight loss testing of the new design p-type TPM217 (no partition) with the Astroquartz/slurry wrap has been continued at both ingradient and isothermal test conditions. A check of one sample after 1000 hours at T/sub H/900 exp 0 C and T/sub C/150 exp 0 C shows a very low weight loss rate, comparable to that reported by the 3M Co. and these tests are continuing. A post-mortem examination of the RCA Reference Generator, which operated for 62,339 hours prior to failure, has been initiated and the metalligraphic analysis was completed during this report period. The remaining MHW generator, Q1-A, on test has accumulated 14,191 hours and performance remains stable. An evaluation of the performance of the Voyager 1 and 2 RTGs after 14,661 hours and 15,160 hours of operation, respectively, versus the DEGRA prediction code, continues to show good agreement. (ERA citation 05:008750)

SAN-1101/PA8-9 PC **A03**/MF **A01**
Aerospace Corp., El Segundo, CA. Energy and Transportation Div.
Pennies a Day: Financing Early Deployment of Photovoltaic Utility Applications Through a User Subsidy.
B. Siegel. May 78, 37p ATR-78(7694-04)-2
Contract EY-76-C-03-1101-008

Calculations indicate that the benefits of photovoltaic generation are unlikely to be soon realized unless the photovoltaic alternative is supported, as other energy technologies have been, by some sort of economic subsidy. This report describes the results of a preliminary investigation of one way of providing the required subsidy: simply allowing the utility company to recover the additional cost of photovoltaic generation through increases in charges to customers. As is shown, a very substantial early penetration of photovoltaic generation capacity into the generation mix of a utility system could be financed by quite modest increases in the annual electric bills of consumers. The analysis procedure used assumes a photovoltaic plant deployment rate and computes the total additional cost of electricity generation that would result from the deployment of the photovoltaic plants rather than of equivalent fossil-fuel plants. This additional annual cost is then apportioned, on a per kWh basis, among all utility customers, and the impact on the average residential customer's electric bill is determined. (ERA citation 04:052785)

SAN-1569-1(V.2)(Pt.1) PC **A24**/MF **A01**
Westinghouse Electric Corp., Lester, PA. Generation Systems Div.
Ocean Thermal Energy Conversion Power System Development. Phase I: Preliminary Design. Final Report.
4 Dec 78, 575p
Contract EG-77-C-03-1569

Westinghouse has completed the Preliminary Desigh Phase for the Power System Development of the Ocean Thermal Energy Conversion (OTEC) Demonstration Plant project. This study included the development of a preliminary design for a Modular Application scaled power system (10MWe) and Heat Exchanger Test Articles, both based on the concept developed in the Conceptual Design Phase. The results of this study were used to improve the baseline design of the 50MWe module for the Commercial Size Power System, which was recommended for the demonstration plant by the conceptual design study. The 50MWe module was selected since it has the lowest cost, and since its size convincingly demonstrates that future economically viable commercial plants, having reliable operation with credible anticipated costs, are possible. Additional optimization studies on the size of the power system plus hull continue to identify 50MWe as the preferred minimum cost configuration. This study was limited to a closed cycle ammonia power system module, using a seawater temperature difference of 40 exp 0 F, and a surface platform/ship reference hull. This volume presents the preliminary design configuration and system optimization. (ERA citation 05:006754)

SAN-1876-2 PC **A03**/MF **A01**
RCA Labs., Princeton, NJ.
Thin-Film Polycrystalline Silicon Solar Cells. Quarterly Report No. 2, December 11, 1978-March 10, 1979.
B. W. Faughnan, J. Blanc, and D. Redfield. May 79, 42p
Contract ET-78-C-03-1876

In the second quarter, 40 solar cells were fabricated on Wacker substrates. One series of cells was used to compare the effect on AM-1 parameters of making the cells from the center region or the edge region of the original 10 x 10-cm wafer. Another series tested the effect of varying the junction diffusion temperatue from 850 to 900 exp 0 C. In both cases the differences were not large, except for diffused junctions at 850 exp 0 C. Passivation of grain boundaries by heating in a plasma discharge containing atomic hydrogen was attempted on a number of cells. With one ion-implanted cell, which was poor to begin with, a 21% improvement in efficiency was obtained. However, on a number of other more efficient cells, there was no significant improvement. A variety of experimental techniques for studying polycrystalline silicon and the effects of grain boundaries were implemented this quarter. They include measurement of minority carrier lifetime, QE curves with and without bias light, QE measurements using a 150- mu m spot, within a grain and including a grain boundary, laser scans across grain boundaries, and deep-level spectroscopy by transient capacitance. These measurements allowed us to assess the effects of grain boundaries on solar-cell performance. The surface topography of etched and polished cells was studied by SEM. An SEM method of determining the crystallographic orientation of small grains, called electron channeling patterns (ECP), was developed.The phosphorus diffusion profiles in Wacker material inside a grain and including a grain boundary were measured by SIMS. The presence of small black inclusions in Wacker material was observed. (ERA citation 05:008272)

SAN-2189-T1 PC **A13**/MF **A01**
Burns and McDonnell Engineering Co., Kansas City, MO.
Feasibility of Cogeneration Application of a 4.8-MW Fuel Cell Power Plant at a Santa Clara, California Paper Mill. Final Report.
D. E. Criner. Jul 79, 300p
Contract ET-78-C-03-2189

This study evaluated the feasibility of employing a 4.8-MW fuel cell power plant in a cogeneration mode. The proposed site for the power plant is at a Santa Clara, California, recycled paper mill owned by the Container Corporation of America. Ways for utilizing the waste heat from the fuel cell within the paper mill were studied. Several uses were identified which would reduce the amount of process steam now generated by conventional fossil-fueled boilers in the paper mill. The electrical energy from the fuel cell could be fed to the municipal electric system owned by the City of Santa Clara or could be used directly by the paper mill, depending upon the form of ownership for the fuel cell. In addition to assessing ownership alternatives for the fuel cell power plant, potential arrangements for operation and maintenance of the plant were studied. Also, the projected cost and availability of alternative fuels for the fuel cell were examined. Economic analyses were performed for several scenarios involving different fuels and ownership arrangements. Breakeven capital costs for the fuel cell power plant were computed for the various scenarios. Sensitivity studies were performed to determine the impact of variations in assumed base values for fuel price, electric rates, and other parameters. Total energy savings resulting from operation of the fuel cell power plant and the potential operational impact of the fuel cell power plant on the City of Santa Clara electric system and CCA Plant were also evaluated. The environmental implications of the fuel cell power plant were assessed in terms of the net changes in air emissions for particulates, sulfur dioxide, and oxides of nitrogen which would occur at the paper mill plant site. As part of the study, a proposed demonstration program was developed for actually installing the fuel cell power plant at the Santa Clara site. (ERA citation 05:001212)

SAN-2208-T1 PC **A04**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Vacuum Deposited Polycrystalline Silicon Films for Solar Cell Applications. Quarterly Technical Progress Report No. 1, September 29-December 31, 1978.
C. Feldman. 15 Jan 79, 68p
Contract ET-78-A-03-2208

A vacuum deposition technique for forming polycrystalline silicon solar cells is being explored. Transition metal diboride layers, being examined as the cell's bottom electrode, were deposited on single crystal (sapphire) and polycrystalline (alumina) Al sub 2 O sub 3 substrates. Graphite substrates were also examined. Boron doped p-type silicon layers were formed by co-deposition in the vacuum at substrate temperature between 1100 exp 0 C and 1200 exp 0 C. Silicon grain size in the films was between 4 mu m and 6 mu m depending on the deposition conditions (supersaturation ratio). The n-type silicon layer was formed by gaseous diffusion into the p-type layer. Detailed secondary-ion mass spectra analysis of silicon, metal borides and substrates was carried out. The most satisfactory devices used TiB sub 2 electrodes on alumina substrates. Solar cell AM 2 efficiencies of 1.8% were about the same as the planar cells formed previously by double-diffusion. (ERA citation 05:000390)

SAN-2208-T2 PC **A03**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Vacuum Deposited Polycrystalline Silicon Films for Solar Cell Applications. Quarterly Technical Progress Report No. 2, January 1-March 31, 1979.
C. Feldman. 30 Apr 79, 45p
Contract ET-78-A-03-2208

Research is being conducted on grain growth phenomena and interactions pertaining to an all-vacuum deposition technique for fabricating thin-film polycrystalline silicon solar cells. Investigations dealt primarily with the structure silicon/TiB sub 2 /alumina substrate, which seems thus far to be the most satisfactory from the standpoint of stability and potential applicability to low-cost solar cells. Secondary ion mass spectrometry was used to study the various interfaces of the device structure and revealed important information on possible sources of impurities and instabilities. Investigation of the B/Ti couple on alumina indicated that a stoichiometric TiB sub 2 back electrode could easily be formed and that excess boron could be removed, probably through reaction with water vapor. Unusually large unoriented grains (approx. 30 mu m) were grown under certain conditions that are described, but not yet fully understood. (ERA citation 05:008273)

SAN-2219-1 PC **A04**/MF **A01**
RCA Labs., Princeton, NJ.
Amorpuous Thin Films for Solar-Cell Applications. Quarterly Report No. 1, September 11-December 11, 1978.
D. E. Carlson, I. Balberg, R. S. Crandall, B. Goldstein, and J. J. Hanak. Jan 79, 72p
Contract ET-78-C-03-2219

This report describes the work performed at RCA Laboratories on the five research tasks of the present contract. The section on theoretical modeling deals with the Meyer-Neldel rule and the thermal generation of Frenkel defects in a-Si:H. In Section III, Deposition and Doping Studies, we de-

scribe our deposition systems and doping studies involving fluorine, carbon, and nitrogen. The next section involves experimental methods for characterizing a-Si:H, and we discuss recent transport measurements in p-type a-Si:H, conductivity measurements as a function of dehydrogenation, tunneling in a-Si:H, surface studies of Pt deposition, and Schottky barriers between electrolytes and a-Si:H (values of V/sub oc/ as high as 1.5 V have been obtained with these barriers). In Section V, Formation of Solar-Cell Structures, we present optimization data for front and back cermet contacts, and we show experimental data for an MIPS structure (MIS cell with a thin p+ layer) as well as for a graded p-i-n cell. Section VI involves the theoretical and experimental evaluation of solar-cell parameters. Laser scanning has been used to investigate the damage created by electron-beam evaporation and to determine the various contributions to the series resistance. Collection efficiency measurements have been performed as a function of bias and indicate that an internal field is necessary for efficient collection. We also discuss the junction characteristics of Pt diodes in terms of a Mott barrier.Finally, we present results on the degradation of a-Si:H cells during fabrication and upon exposure to humidity. (ERA citation 05:008274)

SAND-78-8185(V.1) PC **A13**/MF **A01**
Stearns-Roger Engineering Co., Denver, CO.
Tower Cost Data for Solar Central Receiver Studies. Final Report.
Jun 79, 299p
Contract EY-76-C-04-0789

This report details the work performed to establish solar receiver support tower costs and to investigate the relative importance of the following parameters: (1) materials (concrete and steel), (2) height, (3) weight of the receiver, (4) seismic ground acceleration, (5) wind velocity, (6) soil shear modulus, and (7) soil bearing capacity. The objective of this study was to obtain cost data to be used by Sandia Laboratories in a statistical model to evaluate the effects of the parameters listed. This objective was reached by designing 16 concrete and 17 steel solar receiver support towers, varying the parameters listed above. 29 of these design cases were intended to provide input to the statistical model; cases 17 thru 20 will be used to check the results. The costs of each tower and their foundations are presented. The costs ranged from a low of $40,000 for a structural steel tower, 120 feet high, supporting a receiver weighing 200 kips; to a high of $16,000,000 for a reinforced concrete tower, 1000 feet high, supporting a receiver weighing 8000 kips. The analytical procedure and input are described and itemized estimates are tabulated. (ERA citation 05:008299)

SAND-78-8185(V.2) PC **A99**/MF **A01**
Stearns-Roger Engineering Co., Denver, CO.
Tower Cost Data for Solar Central Receiver Studies. Supplement to Final Report.
Jun 79, 612p
Contract EY-76-C-04-0789

This report describes the work performed under the contract with Sandia Laboratory to establish solar receiver support tower costs and to investigate the relative importance of the following parameters: (1) materials (concrete and steel), (2) height, (3) weight of the receiver, (4) seismic ground acceleration, (5) wind velocity, (6) soil shear modulus, and (7) soil bearing capacity. The objective of this study was to obtain cost data to be used by Sandia Laboratories in a statistical model to evaluate the effects of the parameters listed above. This objective was reached by designing 16 concrete and 17 steel solar receiver support towers, varying the parameters listed above. 29 of these design cases were intended to provide input to the statistical model; cases 17 thru 20 will be used to check the results. This Supplement contains the printouts of the various computer runs that were performed for the study. Thrity-three separate tower designs were fed into the computer program. The resulting printouts are included in sequential order. (ERA citation 05:008300)

SAND-79-0927 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
Photovoltaic Advanced Systems Test Facility Control and Data-Acquisition System.
D. A. Pritchard. Oct 79, 76p
Contract EY-76-C-04-0789

The control and data-acquisition system of the Photovoltaic Advanced Systems Test Facility (PASTF) operated by Sandia Laboratories is described. The system responds to both hardware and software needs of the test facility. A minicomputer implements and controls distributed data acquisition. Extensive data manipulation and graphic display capability exists. The system is easy to use as a result of a wide range of operating software and multiple control languages. (ERA citation 05:000392)

SAND-79-1040C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Review of Selected on-Site DOE Small Solar Thermal Power Plant Experiments.
R. L. Alvis. 1979, 12p CONF-791052-1
Contract EY-C-04-0789
National conference on technology for energy, Albuquerque, NM, USA, 30 Oct 1979.

Three solar power plants ae reviewed that were developed in an effort to find an alternate energy source for powering irrigation pumps. Power generation by the conversion of solar energy has been shown to be technically feasible in the construction and operation of these three solar thermal power systems. Some component problems have been experienced, but these are expected to be solved in future designs. The thermal cycling inherent in solar energy has shown to be more stressful on the system components and requires special design attention to obtain satisfactory performance. The economic benefit of these one-of-a-kind systems has shown they are not competitive with the conventional power systems. However, predictions for similar systems in large production indicate that power could be generated for approximately 5 cents/kWh in the Southwest. Recent increases in conventional energy costs, and continuing component development, are combining to make solar power systems a potential near-term reality. (ERA citation 05:000536)

SAND-79-2043 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Acoustical Studies of Boiling Instabilities in the Prototype Receiver for the Barstow Solar Pilot Plant.
A. G. Beattie. Nov 79, 40p
Contract EY-76-C-04-0789

An acoustic technique is used to search for proposed boiling instabilities in the prototype receiver for the Barstow 10 MW Solar Thermal Pilot Plant. The technique is shown to work and should be capable of measuring such instabilities when the receiver is tested at maximum proposed power levels. (ERA citation 05:008302)

SAND-79-8259 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Materials Performance in the Solar Central Receiver Pilot Plant.
J. C. Swearengen, and S. L. Robinson. Oct 79, 36p
Contract EY-76-C-04-0789

The 10 MW/sub e/ Solar Central Receiver Pilot Plant, which is to be built at Barstow, California, is designed to provide development, fabrication, and operating data necessary to demonstrate the technical feasibility of the solar central receiver concept. The Pilot Plant consists of approximately 2000 reflecting heliostats which redirect solar insolation to a central receiver mounted on a tower. The energy collected by the receiver is used to produce superheated steam which is then used to generate electricity and/or charge storage. Performance of the plant will be studied during a five year test period scheduled to begin December 1981. The plant is being designed for a thirty year life. For the Pilot Plant, successful performance requires materials having not only the proper initial properties, but also having long-term stability in the presence of thermal, chemical, and mechanical environments. For purposes of this discussion materials concerns are categorized into four operating subsystems of the plant: collectors, receiver, storage, and electrical power generation. (ERA citation 05:008304)

SERI/TR-35-234 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
General Reliability and Safety Methodology and Its Application to Wind Energy Conversion Systems.
M. Edesess, and R. D. McConnell. Sep 79, 52p
Contract EG-77-C-01-4042

In conventional system reliability calculations, each component may be in the Operable state or the Under Repair state. These calculations derive system unavailability, or the probability of the system's being down for repairs. By introducing a third component state between Operable and Under Repair - namely, Defective, But Defect Undetected - the methods developed in this report enable system safety projections to be made in addition to availability projections. Also provided is a mechanism for computing the effect of inspection schedules on both safety and availability. A Reliability and Safety Program (RASP) is detailed which performs these computations and also calculates costs for system inspections and repairs. RASP is applied to a simplified wind energy conversion system example. (ERA citation 05:002919)

SERI/TR-8016-1 PC **A10**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Thermal Repowering Utility Value Analysis. Final Report.
R. Taylor, J. Day, B. Reed, and M. Malone. Dec 79, 225p
Contract EG-77-C-01-4042

The retrofit of solar central receiver energy supply systems to existing steam-electric generating stations (repowering) is being considered as a major programmatic thrust by DOE. The determination of a government response appropriate to the opportunities of repowering is an important policy question, and is the major reason for the analysis. The study objective is to define a government role in repowering that constitutes an efficient program investment in pursuit of viable private markets for heliostat-based energy systems. In support of that objective, the study is designed to identify the scope and nature of the repowering opportunity within the larger context of its contributions to central receiver technology development and commercialization. The Supply and Integration Tasks are documented elsewhere. This report documents the Demand Task, determining and quantifying the sources of the value of repowering and of central receiver technology in general to electric utilities. The modeling tools and assumptions used in the Demand Task are described and the results are presented and interpreted. (ERA citation 05:008309)

SERI/TR-8037-1 PC **A08**/MF **A01**
Stearns-Roger Services, Inc., Denver, CO.
Solar Thermal Repowering Systems Integration. Final Report.
L. J. Dubberly, J. E. Gormely, and A. W. McKenzie. Aug 79, 156p
Contract EG-77-C-01-4042

This report is a solar repowering integration analysis which defines the balance-of-plant characteristics and costs associated with the solar thermal repowering of existing gas/oil-fired electric generating plants. Solar repowering interface requirements for water/steam and salt or sodium-cooled central receivers are defined for unit sizes ranging from 50 MWe non-reheat to 350 MWe reheat. Finally balance-of-plant cost estimates are presented for each of six combinations of plant type, receiver type and percent solar repowering. (ERA citation 05:000434)

UCID-18041-4 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Systematic Computation of the Performance of Photovoltaic Cells Based on First Principles. First and Second Quarter Report, October 1, 1978--March 30, 1979.
J. H. Yee, G. J. Burke, and R. G. Harvey. 4 May 79, 43p
Contract W-7405-ENG-48

The optical absorption coefficient for the ternary compounds CdSiAs sub 2 and CuInSe sub 2 have been calculated theoretically, based upon the pseudopotential technique and reflectivity data. The experimental absorption coefficient of CuInSe sub 2 agrees very well with the calculated absorp-

tion coefficient. Computer simulation was carried out for a CdS--CuInSe sub 2 heterojunction solar cell. The theoretical results compare favorably with the experimental result. Derivation of an expression for the minority-carrier diffusion length in CuInSe sub 2 together with some numerical results for the diffusion length are presented. The Schottky barrier height for Cu sub 2 O has been calculated and the independence of the barrier height on the work function of the metals explained. A model explaining the unconventional behavior of indium doped CdS is presented. The model involves the formation of indium clusters causing conduction band distortions. (ERA citation 04:044512)

UCRL-83473 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Space-Charge-Limited Current and Capacitance in Cu/sub X/S/CdS Solar Cells.
R. Moorthy, L. D. Partain, and D. Henderson. 5 Oct 79, 6p CONF-791208-1
Contract W-7405-ENG-48
International electron devices meeting, Washington, DC, USA, 3 Dec 1979.

The unusual behavior of Cu/sub x/S/CdS solar cells is better described with space-charge-limited current (SCL I) than with standard junction models. The SCL I theory provides the first quantitative evaluation of these devices' I-V characteristics including their non-exponential form, the dark-light crossover, the temperature independent slope in addition to qualitatively modeling the voltage variation of capacitance. This is accomplished with trapping parameter values well known to be characteristic of Cu compensated CdS. It indicates that the voltage dependence of current is controlled by mechanisms entirely different than previously proposed with important implications for device fabrication and optimization and ultimate device performance. (ERA citation 05:000395)

10C. Energy Storage

BMFT-FB-T-79-03 PC **A04**/MF **A01**
Varta Batterie A.G., Kelkheim (Germany, F.R.). Forschungs- und Entwicklungszentrum.
Galvanic Cells with Doped CaF sub 2 as a Solid Electrolyte.
M. Koriath, and R. Braeutigam. Jun 79, 66p
In German.
U.S. Sales Only.

Galvanic cells of the type Ca/CaF sub 2 /MeF sub 2 with Me = Cu, Ni, Fe show high theoretical energy densities of 1000 to 1200 Wh/kg. Therefore, it can be expected that these systems may be competitive to cells of the type Na/ beta -Al sub 2 O sub 3 /S. Earlier work has shown that the cell Ca/CaF sub 2 /CuF sub 2 is the most promising one. Cells of this type have been built in a charged state. However, as the charged electrode materials, i.e., Ca and CuF sub 2 , cannot be handled under open air, it seems to be of advantage to assemble cells in the discharged state. Therefore, discharged cells were built and tested. It was shown that the cells show a high rate of self-discharge after the first charge. This is probably due to the generation of an electronic conductivity in the electrolyte during charge. It is recommended that this program be discontinued. 16 figures, 2 tables. (ERA citation 05:007244)

BMVg-FBWT-79-12 PC **A05**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Pfinztal (Germany, F.R.). Inst. fuer Chemie der Treib- und Explosivstoffe.
Latent Heat Storage Devices. Part 1: Properties and Possible Applications of Latent Heat Storage Devices.
K. Krichel. 1979, 84p
In German.
U.S. Sales Only.

A special card-record system has been established that indicates the most significant physicochemical data like melting point, specific enthalpy of fusion, crystallization kinetics, etc. of potential phase-change materials which have been reported in the literature since 1951. The best storage materials in the lower temperature range (- 30 to 100 exp 0 C) are paraffins, salt-hydrates, clathrates, and their mixtures. In the medium temperature region (100 to 500 exp 0 C) hydroxides and halides of light metals and their mixtures are most suitable. The best storage properties at high temperatures (> 500 exp 0 C) show alkali- and alkaline earth-halides, especially -fluorides. Adaption of different latent heat capacitor designs to operational temperature and storage material, and the relation between heat transport, heat exchanger construction and type of crystallization are discussed. Possible failures caused by unfavorable crystallization kinetics (stratification, supercooling) and some measures to avoid such faults are described. Construction and insulation materials with special emphasis on corrosion and stability problems are reviewed. All data and members are presented in form of extented tables, if possible. (ERA citation 05:004537)

BMVg-FBWT-79-13 PC **A04**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Pfinztal (Germany, F.R.). Inst. fuer Chemie der Treib- und Explosivstoffe.
Latent Heat Storage Devices. Part 2: Storage Masses, Constructional Shapes and Materials for Melt Heat Storage Devices.
K. Krichel. 1979, 65p
In German.
U.S. Sales Only.

Latent heat storage systems make use of the enthalpies of phase changes to store thermal energy. The operational temperature depending on the phase change material remains constant at charge and discharge. Melting is the most appropriate phase change for heat storage due to considerable heat capacities and high densities of condensed phases. Because of the promising technical and operational advantages of latent heat storage the report deals with thermodynamic, kinetic and chemical properties of phase change materials. Eutectics and congruently melting compounds are the most useful substances among the potentially suitable latent heat storage materials. At present supercooling of many storage media is a considerable difficulty. Besides the treatment of economics, safety hazards and environmental problems and the description of some practical applications, two suggestions for the military applicability of latent heat storage devices are discussed. (ERA citation 05:004538)

PAT-APPL-6-016 036 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Air Ejector Augmented Compressed Air Energy Storage System.
Patent Application,
F. W. Ahrens, and G. T. Kartsounes. Filed 28 Feb 79, 12p
Contract W-31-109-ENG-38
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Energy is stored in slack demand periods by charging a plurality of underground reservoirs with air to the same peak storage pressure, during peak demand periods throttling the air from one storage reservoir into a gas turbine system at a constant inlet pressure until the air presure in the reservoir falls to said constant inlet pressure, thereupon permitting air in a second reservoir to flow into said gas turbine system while drawing air from the first reservoir through a variable geometry air ejector and adjusting said variable geometry air ejector, said air flow being essentially at the constant inlet pressure of the gas turbine system. (ERA citation 05:029155)

PAT-APPL-6-039 412 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Compressed Air Energy Storage System.
Patent Application,
F. W. Ahrens, and G. T. Kartsounes. Filed 15 May 79, 23p
Contract W-31-109-ENG-38
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An internal combustion reciprocating engine is operable as a compressor during slack demand periods utilizing excess power from a power grid to charge air into an air storage reservoir and as an expander during peak demand periods to feed power into the power grid utilizing air obtained from the air storage reservoir together with combustion reciprocating engine is operated at high pressure and a low pressure turbine and compressor are also employed for air compression and power generation. (ERA citation 05:029156)

PNL-3047 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Numerical Analysis of Temperature and Flow Effects in a Dry, Two-Dimensional, Porous-Media Reservoir Used for Compressed Air Energy Storage.
L. E. Wiles. Oct 79, 87p
Contract EY-76-C-06-1830

The purpose of the work is to define the hydrodynamic and thermodynamic response of a CAES dry porous media reservoir subjected to simulated air mass cycling. The knowledge gained will provide, or will assist in providing, design guidelines for the efficient and stable operation of the air storage reservoir. The analysis and results obtained by two-dimensional modeling of dry reservoirs are presented. While the fluid/thermal response of the underground system is dependent on many parameters, the two-dimensional model was applied only to those parameters that entered the analysis by virtue of inclusion of the vertical dimension. In particular, the parameters or responses that were quantified or characterized include wellbore heat transfer, heat losses to the vertical boundaries of the porous zone, gravitationally induced flows, producing length of the wellbore, and the effects of nonuniform permeability. The analysis of the wellbore heat transfer included consideration of insulation, preheating (bubble development with heated air), and air mass flow rate. (ERA citation 05:004533)

PNL-3062 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Thermal Energy Storage in Aquifiers: Preliminary Information.
R. D. Allen. Dec 79, 86p
Contract EY-76-C-06-1830

Topics discussed include: conceptual designs; numerical modelling; field experiments; relevant technical information; feasibility studies; preliminary aquifer selection considerations; and preliminary design and operating considerations. (ERA citation 05:008610)

PNL-3167 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Geochemical Equilibrium Modeling of the Auburn Thermal Energy Storage Field Test.
J. A. Stottlemyre, R. P. Smith, and R. L. Erikson. Oct 79, 47p
Contract EY-76-C-06-1830

The objective of the study was to investigate some alternate reservoir damage mechanisms that may have contributed to the loss of well injectivity experienced at the Mobile field site. Specifically, this includes mineral precipitation and/or alteration resulting from: 1) increased temperatures and temperature gradients, 2) presence of oxygen, 3) fluid-fluid incompatibility (mixing of two different aquifer waters), and 4) fluid-rock imcompatibility (introducing foreign groundwaters into storage aquifer sedimentary matrix). The primary investigatory tool used in the study is an Electric Power Research Institute computer program (EQUILIB), which is based on equilibrium chemical thermodynamics. The computer code was utilized to simulate changes in mineralogy and groundwater chemistries due to the interaction of the sediment material and two differing aquifer waters at temperatures of 55 exp 0 C, 100 exp 0 C, and 150 exp 0 C. Conclusions are primarily based on the 55 exp 0 C results since this was the maximum operating temperature for the Auburn experiment. (ERA citation 05:008611)

SAND-78-2282 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.

Numerical Simulation of Dual-Media Thermal Energy Storage Systems.
R. J. Gross, C. E. Hickox, and C. E. Hackett. Aug 79, 32p
Contract EY-76-C-04-0789

A finite-difference, predictor-corrector, numerical technique originated by MacCormack is used to solve for fluid and solid temperature distributions in one dimensional flow through a finite length packed bed. The method allows for temperature dependent properties, time varying inlet conditions and nonuniform initial conditions. Computed results agree with the classical Schumann model to within 1% in simulations which exhibit thermal gradients as large as 310 exp 0 C/m. Additional examples illustrate the attractive characteristics of the method, namely its accuracy, flexibility, ease of implementation, and computational efficiency. (ERA citation 05:001138)

SAND-79-0869C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Lithium Battery Storage and Discharge Tests.
S. C. Levy. 1979, 10p CONF-791017-10
Contract EY-76-C-04-0789
International conference on chemical vapor deposition, Los Angeles, CA, USA, 14 Oct 1979.

A six-year storage and discharge test of ambient-temperature lithium batteries was initiated. Lithium-sulfur dioxide cells from three manufacturers and lithium polycarbon monofluoride cells from a fourth manufacturer are included. Capacity versus rate and temperature, storage versus temperature and discharge at constant and pulsed loads are being studied. Two problems were identified which will prevent cells from operating continuously for five years. They are corrosion of the glass in the glass-to-metal seal and corrosion of the anode-to-can contact. In addition, cells exposed to high-temperature storage experienced corrosion of the aluminum-to-tantalum weld in the positive lead. 15 figures. (ERA citation 05:003139)

SAND-79-1782C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Batteries for Specific Solar Applications: Project Description.
1979, 47p CONF-790768-1
Contract EY-76-C-04-0789
Sandia photovoltaic/battery storage meeting, Albuquerque, NM, USA, 26 Jul 1979, Portions of document are illegible.

The Sandia Laboratories electrochemical power sources program is outlined. The project is divided into five tasks: (1) battery requirements analysis; (2) laboratory evaluation; (3) photovoltaic advanced systems tests; (4) photovoltaic application experiments; and (5) battery research and development. Status of the tasks is reviewed. (ERA citation 05:000393)

SAND-79-1803C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Comparative Analyses of Solar Energy Storage Cycles.
C. E. Hackett. 1979, 25p CONF-790954-1
Contract EY-76-C-04-0789
18. international conference on solar energy, Milan, Italy, 23 Sep 1979.

A thermodynamic technique is presented which will enable the assessment of the overall performance of various storage options on an absolute basis so that cost effective designs can be developed to obtain the full thermodynamic and system advantages of energy storage. First the underlying thermodynamic principles of entropy production analysis are examined. The various energy storage schemes are classified. Detailed analyses were developed to cover the various generic types of energy storage which are appropriate for solar power systems. (ERA citation 04:056321)

SAND-79-8814 PC **A02**/MF **A01**
Sandia Labs., Livermore, CA.
Sandia Laboratories In-House Activities in Support of Solar Thermal Large Power Applications.
R. W. Mar. 1979, 5p
Contract EY-76-C-04-0789

Research activities have been planned and carried out in direct support of the development of thermal energy storage subsystems for solar thermal large power applications. The emphasis has been on characterizing the behavior of molten nitrate salts with regard to thermal decomposition, environmental interactions, and corrosion. The results to date and future activities are summarized. (ERA citation 05:008385)

STUDSVIK/EP-79/104 PC **A03**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Heat Storage in Rock Cavities Filled with Fluid.
S. Westerberg. Jan 79, 36p
In Swedish.
U.S. Sales Only.

Heat storage in rock cavities filled with fluid was studied. In most of the computer calculations performed the storing fluid was oil in order to obtain results which could be directly compared to experimental data which mostly are taken from existing heated rock cavity stores for oil. (ERA citation 04:056730)

Y-2210 PC **A03**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Oak Ridge Flywheel Evaluation Laboratory. Annual Report, April 1, 1979-September 30, 1979.
R. S. Steele, Jr., J. M. Casstevens, and B. J. Sutton. Dec 79, 29p
Contracts W-7405-ENG-48, W-7405-ENG-26

The Oak Ridge Flywheel Evaluation Laboratory (ORFEL) was assembled, and the initial stages of proof testing were completed in FY 1979. The significant accomplishments for the past year included the establishment of adequate full-time personnel; facility modification to reflect the emphasis on flywheel evaluation over simple testing; and the facility proof test involving two aluminum disk flywheels and one composite flywheel. This report contains details of the FY 1979 program plans for ORFEL, personal profiles of the dedicated manpower, and details of the tests performed. (ERA citation 05:010177)

11. MATERIALS

11A. Adhesives and Seals

AD-A086 681/4 PC **A02**/MF **A01**
Medical Coll of Wisconsin Milwaukee Dept of Pathology
On the Sealing of Gas-Filled Glass Ampoules.
Technical rept.,
Donald Greiff, Hewlett Melton, and Terence W. G. Rowe. 14 Jun 74, 16p
Contract N00014-69-C-0199, Grant NIH-69-2070
Pub. in Cryobiology, v12 n1 p1-14 Feb 75.

No abstract available.

AD-A086 872/9 PC **A04**/MF **A01**
Pratt and Whitney Aircraft Group West Palm Beach FL Government Products Div
Chem-Braze Abradable Seal Attachment.
Final rept. 6 Oct 78-15 Oct 79,
Charles C. McComas, Steve T. Narsavage, and Hal W. Pettit, Jr. May 80, 51p PWA-FR-12248, USAAVRADCOM-TR-80-F-5
Contract DAAG46-78-C-0062

An improved Chem-Braze bonding system for attaching sintered abradable seals to compressor blade tip-shrouds was developed. The improved Chem-Braze system incorporates glycerin as an inhibitor to prevent premature evaporation which prolongs working life and allows adequate time to attach seals to engine hardware. Manufacturing guidelines including glycerin concentration, working environment, slurry thickness, bonding pressure, drying and curing parameters, and refurbishing techniques were established. Tooling techniques for attaching abradable seals to engine hardware using this improved system were selected based on a feasibility demonstration which incorporated simulated engine hardware. Nondestructive inspection (NDI) techniques for verifying bond integrity were investigated, but a satisfactory technique was not identified. A preliminary economic analysis indicated significant cost savings for attaching abradable seals to compressor blade tip-shrouds using the improved Chem-Braze system compared to attachment with gold-nickel braze. (Author)

N80-27695/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Dynamic Analysis of Noncontacting Face Seals.
I. Etsion. May 80, 40p NASA-TM-79294, E-458

The dynamic behavior of a noncontacting coned face seal is analyzed taking into account various design parameters and operating conditions. The primary seal ring motion is expressed by a set of nonlinear equations for three degrees of freedom. These equations, which are solved numerically, allow identification of two dimensionless groups of parameters that affect the seal dynamic behavior. Stability maps for various seals are presented. These maps contain a stable-to-unstable transition region in which the ring wobbles at half the shaft frequency. The effect of various parameters on seal stability is discussed and an empirical expression for critical stability is offered.

STUDSVIK-79-2 PC **A05**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Furnace Testing of Electrical and Pipe-Penetration Seals Based on Foamed Silicone Elastomer: 60, 90, and 120-Minute Fire Ratings.
A. Brown. Mar 79, 83p
U.S. Sales Only.

Fire tests of foamed silicone seals for electrical and pipe penetrations have been performed using a furnace with temperature control as heat source. The tests were performed in principle in accordance with the requirements of NORDTEST 5A (ISO 834). The purpose of the tests was to obtain appropriate fire ratings for different seal thicknesses. The report covers. - Description of material used to prepare the seals and method of application - Description of furnace test assembly and method of performing test - Listing of penetrating elements and of the thermocouple array used to measure temperature - Curves of thermocouple readouts and photographs of seals during and after completion of the test. (Atomindex citation 10:490683)

11B. Ceramics, Refractories, and Glasses

AD-A086 317/5 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center Watertown MA
Stepped Temperature Stress-Rupture Testing of Silicon-Based Ceramics.
George D. Quinn, and R. Nathan Katz. 26 Apr 78, 10p Rept no. AMMRC-TR-80-28
Contract E(49-28)-1017
Pub. in American Ceramic Society Bulletin, v57 n11 p1057-1058 Nov 78.

No abstract available.

AD-A086 653/3 PC **A04**/MF **A01**
Northwestern Univ Evanston IL Dept of Materials Science
Fracture Studies of High Temperature Ceramics.
Final rept. 1 Oct 75-30 Sep 79,
D. Lynn Johnson. May 80, 67p AFOSR-TR-80-0501
Grants AFOSR-76-2920, NSF-DMR76-80847

A high-temperature isothermal instrumented impact testing apparatus was designed and built

and utilized to test a variety of high performance ceramic materials at temperatures up to 1500 C. Test specimens were held on an anvil in the furnace and heated rapidly to the test temperature. An impacter broke the samples in 3-point bending, and high speed digital recorders stored the outputs of force and velocity transducers. The controlled flaw technique was utilized to obtain the critical stress intensity factor, K sub IC. Hot-pressed silicon nitride materials containing MgO, CeO2 or ZrO2 sintering aids showed a decrease in K sub IC as the temperature exceeded 1300 C. Hot-pressed silicon carbide containing alumina sintering aid showed a similar decrease. Sintered alpha-SiC, on the other hand, showed a gradual increase in K sub IC at temperatures up to 1500 C. Reaction bonded SiC failed to break at the controlled flaw, but exhibited a drop in impact fracture force at temperatures approaching the melting point of silicon. (Author)

AERE-R-9359 PC **A03**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Investigation of Ion Beam Irradiation Techniques for the Simulation of 14 MeV Neutron Irradiation of Ceramics at High Temperatures.
G. P. Pells. Mar 79, 28p
U.S. Sales Only.

Experimental techniques have been developed for the irradiation of oxide, ceramic materials, by ion beams of MeV energies, up to power densities of 5 x 10 exp 5 W/m exp 2 at 800 exp 0 K and above. For experimental work with the facilities at Harwell in the foreseeable future it is proposed that 4 MeV N exp + or 6 MeV Ne exp + ion irradiation of thin foils will give the best simulation of 14.1 neutron irradiation. (Atomindex citation 10:490743)

BMFT-FB-T-78-51 PC **A05**/MF **A01**
Rosenthal Technik A.G., Selb (Germany, F.R.).
Development of High-Temperature Resistant, Noncorrosible, Nonmetallic Ceramic Materials, Especially Silicon Nitride for Heat Exchangers in Gas Turbine Application.
S. R. Schindler, and A. Krauth. Dec 78, 84p
In German.
U.S. Sales Only.

The report is part of the project Ceramic Materials for Automobile Gas Turbines, which has been sponsored by the Ministry for Research and Technology of the Federal Republic of Germany since 1974. Special effort has been made in the development of silicon nitride, suitable production techniques as well as the production of heat exchanger prototypes and gas turbine components. Tight connection of production techniques, construction and testing in simulated application conditions made it possible to transfer the material data from test specimens to structural components. Combustion chambers and stators were produced and tested. The results in heat exchanger development concerning permeability, thermal and mechanical loading are promising and speak for a successful continuation of the R and D project. (ERA citation 05:003302)

NIIAR-P-35(329) PC **A02**/MF **A01**
Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Relaxation of Radiation-Induced Conductivity in Inorganic Dielectrics.
G. I. Sochilin, and V. V. Sarksyan. 1977, 12p
In Russian.
U.S. Sales Only.

The relaxation of radiation-induced conductivity in case of irradiation of electrotechnical ceramic samples in a reactor is investigated. The existence of the radiation-induced conductivity current in the sample was revealed under "quasi-isothermal" conditions by measuring the dependences betweeen the current through the sample and its temperature and between the current through the sample and the current in the ionization chamber in case of emergency shut-down of the reactor. The current in the ionization chamber was used as a signal proportional to the reactor power. At a constant sample voltage the relaxation of the current of radiation-induced conductivity is observed due to changes in the internal field. It is necessary to take account of this effect while selecting radiation-resistant insulators. (Atomindex citation 10:439053)

NRCN(TN)-019 PC **A02**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Increase of the Density of Commercial Graphite.
H. Tobias, and D. Meyerstein. Dec 77, 11p
In Hebrew.
U.S. Sales Only.

The increase of the density of commercial graphite of the type ATJ by polymerization of an impregnated monomer, followed by pyrolysis, is described. The monomer which was either styrene or acrylonitrile, was irradiated by a exp 60 Co source and pyrolized in a standard vacuum system. The irradiation dose for the polymerization of the monomer was determined. Suggestions for the establishment of the optimum conditions are offered. (Atomindex citation 10:432832)

N80-27483/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effect of W and WC on the Oxidation Resistance of Yttria-Doped Silicon Nitride.
S. Schuon. 30 Apr 80, 12p NASA-TM-81528, E-9744
Presented at the Annual Meeting of the AM. Ceramic Soc., Chicago, 28-30 Apr. 1980.

The effect of W and WC contamination on the oxidation and cracking in air of sintered Si3N4 - 8 w/o Y2O3 ceramics at 500, 750, and 1350 C is examined. A mixture of Si3N4 - 8Y2O3, milled with alumina balls, was divided into four portions. Three portions were doped with 2 w/o WC W, and 4 w/o W respectively, in order to simulate contamination during milling. The fourth portion was undoped and used on a control. The addition of W or WC did not affect the phase relationships in the system, as all bars with or without additions contained melilite as the major Si-Y-O-N phase after sintering. At 750 C, instability (rapid oxidation and cracking) of W-doped bars appears to have occurred as a result of oxidation of the tungsten containing melilite phase. No intermediate temperature instability was observed in bars containing 2 w/o WC or in bars with no additive. Specimens exposed at 1350 C had good oxidation resistance due to the formation of a protective siliceous oxide layer. A specimen containing 4 w/o W which was preoxidized at 1350 C had improved oxidation resistance at 750 C. The tendency towards oxidation and cracking of Si3N4 - 8 Y2O3 at 750 C is concluded to be related to tungsten content of the sintered bars.

N80-27484/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effect of Starting Powder Characteristics on Density, Microstructure and Low Temperature Oxidation Behavior of a Si3n48w/O Y2O3 Ceramic.
S. Schuon, and S. Dutta. 1980, 23p NASA-TM-81536, E-490
Presented at the Ann. Meeting of the AM. Ceramic Soc., Chicago, 28-30 Apr. 1980.

The densification and oxidation behavior of Si3N4 - 8w/oY2O3 prepared from three commercial starting powders were studied. Bars of SN 402, SN 502, and CP 85/15 were sintered for 3 to 4.5 hours at 1750 C. A second set was hot pressed for 2 hours at 1750 C. The microstructures were studied by transmission electron microscopy and scanning electron microscopy, densities were determined, and the phase compositions were determined by X-ray diffraction. Densification and microstructure were greatly influenced by the starting powder morphology and impurity content. Although SN 402 exhibited the maximum weight lose, the highest sintered and hot pressed densities were obtained with this powder. All powders had both equiaxed and elongated grains. Sintered bars were composed of beta silicon nitride and n-melelite. In contrast, hot pressed bars contained beta silicon nitride, H-phase, and J-phase, but no melelite. Yttria distribution in sintered bars was related to the presence of cation impurities such as Ca, Fe, and Mg. A limited oxidation study at 750 C in air showed no instability in these Si3N4 - 8 w/oY2O3 specimens, regardless of startin powder.

PAT-APPL-6-061 167 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Improved Method for Producing Small Hollow Spheres.
Patent Application,
A. Rosencwaig, J. C. Koo, and J. L. Dressler.
Filed 26 Jul 79, 26p
Contract W-7405-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved method and apparatus for producing small hollow spheres of glass having an outer diameter ranging from about 100 mu to about 500 mu with a substantially uniform wall thickness in the range of about 0.5 to 20 mu are described. The method involves introducing aqueous droplets of a glass-forming solution into a long vertical drop oven or furnace having varying temperature regions. (ERA citation 05:028549)

PNL-2836 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Experimental Determination of Radiation Damage Function for Graphite.
W. J. Gray, and W. C. Morgan. Jul 79, 52p
Contract EY-76-C-06-1830

Highly oriented pyrolytic-graphite samples were irradiated in three different neutron sources with average energies of 1.5, 5.5, and 14.8 MeV, respectively. The resulting changes in the basal-plane elastic shear moduli of these samples show that the relative damage rate is substantially higher at the higher neutron energies than is predicted by existing models. The results of these experiments have been used to generate a new relative damage function which will allow better projections of graphite radiation behavior in fusion reactors based on data obtained by irradiations in fission reactors. (ERA citation 05:001497)

SAND-79-8225 PC **A02**/MF **A01**
Sandia Labs., Livermore, CA.
Weathering of Low Iron Float and CGW-0317 Glasses.
J. E. Shelby, and J. Vitko. May 79, 23p
Contract EY-76-C-04-0789

A simple accelerated weathering test was used to evaluate the relative weatherability of glasses which are being considered for use in solar heliostats. Glasses were exposed to 98 to 100% humidity at temperatures ranging from 40 to 80 exp 0 C for periods of one to four weeks. Under these conditions, low-iron float glass exhibits severe surface corrosion, which occurs predominantly on the tin poor surface. This result indicates that silvering the tin-poor surface will increase the weatherability of mirrors made from this glass. CGW-0317 fusion glass exhibits no detectable signs of surface corrosion. (ERA citation 04:044554)

UCRL-15124 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Feasibility Study for Ductile Machining of Glass. Final Report January 1, 1979-September 30, 1979.
I. Finnie, J. Giovanola, A. Misra, and R. Glardon. Dec 79, 93p
Contract W-7405-ENG-48

Results are presented of a study aimed at determining the feasibility of the ductile machining of silicate glasses lead-silicate glass is readily amenable to ductile cutting using heptanol cutting fluid. Fused silica displayed no sign of ductile behavior. (ERA citation 05:010377)

11C. Coating, Colorants, and Finishes

AD-A086 531/1 PC **A02**/MF **A01**
Electronics Research Lab Adelaide (Australia)
The Flash Evaporation of Powdered Indium Antimonide.
Technical rept.,
R. H. Hartley. Jan 80, 21p Rept no. ERL-0103-TR

It has been shown experimentally for deposition rates of practical interest, that the flash evapora-

tion of powdered indium antimonide from a black body source yields a stoichiometric vapour over a wide angular range about the axis of the source. Films deposited by this means have an excellent surface finish and are free from the surface defects often associated with flash evaporation employing other source geometries. (Author)

AD-A086 730/9 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Studies on Corrosion Prevention of Mardan Connectors by Organic Coatings.
Final rept. May 77-Sep 79,
B. J. Kinzig, and J. S. Murday. 9 Jun 80, 41p
NRL-MR-4230, AD-E000 464
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Electrical disturbances caused by the formation of corrosion products on computer contacts is a serious problem, especially in older contacts containing a tarnish-prone silver layer under gold plating. The efficacy of a number of corrosion preventative organic fluids in preventing corrosion in sulfide-bearing atmospheres has been evaluated, in conjunction with a chromating process for the same purpose. Studies were made both with connectors and with silver. A statistical treatment applied to visual evaluation clearly identified two organic formulations as effective corrosion inhibitors, verifying other observations. These fluids were as effective as chromating alone, but an additional measure of protection was afforded by the combination of chromate/organic fluid. (Author)

AD-A086 791/1 PC **A03**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
An Investigation of a Composite Oxide Film as a Corrosion Inhibitor for 2024 Aluminum.
Interim rept. Jan-Dec 79,
Neil T. McDevitt, and Frank N. Weaver. Jun 80, 38p Rept no. AFWAL-TR-80-4065

This study shows the corrosion resistance of the oxide film on 2024 aluminum can be improved over the neat anodic oxide by forming a composite oxide film using as a sequential process a chromate conversion solution dip followed by phosphoric acid anodization. (Author)

BCRA-53 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Use of Oven Carry-over and Preheater Fines in the Production of Coal-Tar Enamel Modulates.
Aug 78, 7p
U.S. Sales Only.

An experiment was carried out to determine whether the oven preheater fines and carry-over emissions, respectively, from preheating and pipeline charging of coal to coke-ovens, can be used as a substitute for the pulverized coal normally used in the production of modified coal-tar pipeline enamels. Samples of typical preheater fines and oven carry-over from the BCRA experimental coke-ovens were characterized and then used to prepare enamel modulates (i.e., the enamel without inert filler) by digestion in tar at 300 exp 0 C. The products were tested to the relevant softening point and penetration clauses of BS4164:1967. The materials examined gave modulates which satisfied the softening point and penetration tests of BS4164, although some modification to the normal formulation was necessary. The pulverized coal and tar normally used are at present roughly similar in cost, and the use of a larger proportion of carry-over or preheater fines in place of the coal should be worthwhile, provided the cost of obtaining these materials in dry form is not too high. (ERA citation 05:021649)

PB80-205131 Not available NTIS
National Bureau of Standards, Washington, DC.
The Influence of Environmental Exposure on Solar Collectors and Their Materials.
Final rept.,
D. Waksman, E. Streed, and A. Dawson. 1980, 5p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Proceedings of American Section/International Solar Energy Society 1980 Annual Meeting, Phoenix, AZ p415-419, 2-6 Jun 80.

Efforts in the development of reliability/durability tests for solar collectors and their materials have been hampered by the lack of data on the real time and accelerated degradation of these materials. The focus of this paper is upon research related to the development of standards for evaluating the reliability and durability of cover plate and absorber materials used in flat plate solar collectors. In this research, several different types of collectors, cover plates and absorbers are being studied in laboratory and field tests. Optical property measurements are being performed in conjunction with aging tests intended to induce degradation in the materials. The aging tests include accelerated laboratory exposure of material specimens and outdoor exposure of these materials in simulated solar collectors. Full-size solar collectors in which several of these materials are used are being concurrently subjected to outdoor and solar simulator exposure. Changes in thermal performance at the collector level are being compared with changes in optical properties at the materials level. The results obtained in the first year of this study are presented.

UCID-18277 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Status of SiO sub 2 /TiO sub 2 HR Coating Damage.
W. H. Lowermilk. 13 Sep 79, 11p
Contract W-7405-ENG-48

The data, observations, and conclusions from a number of experiments on high-reflector (HR) coating damage which were done in FY 1979 are summarized. Damage threshold measurements for the experiments described are presented. (ERA citation 05:003387)

UCRL-Trans-11504 PC **A02**/MF **A01**
Method of Applying a Stannic Oxide Film to Glass.
E. V. Barabolkina, A. I. Bychenkov, M. P. Malafeev, and A. N. Sirotinin. Aug 79, 10p
Contract W-7405-ENG-48
C USSR Patent 607,809 (1978).

Methods of applying metal-oxide coatings to a glass surface are related, and can be used in the manufacture of electronic devices that have glass structural elements, to create chemically and thermally stable electrical connections and to increase the strength of the film by creating an electrical contact. (ERA citation 05:007410)

11D. Composite Materials

AD-A086 282/1 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign
A Fundamental Study of a New Fabrication Technique for Fiber Reinforced Aluminum Matrix Composites.
Final rept. 22 Mar 76-11 Aug 79,
R. Mehrabian. 20 Apr 80, 20p ARO-13847.3-MSX
Grants DAAG29-76-G-0170, DAAG29-78-G-0067

The feasibility of fabricating fiber-reinforced aluminum alloys by addition of discontinuous fibers to partially solid slurries and completely liquid matrices was investigated. In the first phase of the program, emphasis was placed on the study of interface interactions between polycrystalline Al2O3 fibers and Al-2 to 8%Mg, Al-4.5%Cu and Al-4.5%Cu-1 to 2%Mg alloys produced by the slurry process. In general, it was observed that the incorporation of fibers could be readily achieved by this technique, and that fibers appeared wetted after a few minutes of contact with the melt. The composites produced exhibited an intimate, void free bond between the constituents. In addition, a region of significantly altered microstructure resulted from accumulation of oxide and/or aluminate particles which either formed within the melt and were attached to the moving fibers, or used the fiber surface as a substrate to grow on. Microscopic examination of this interaction zone and thermodynamic considerations indicated that it consisted of fine alpha-Al2O3, aluminates, oxides of the alloying elements, and probably some intermetallic compounds.

AD-A086 306/8 PC **A03**/MF **A01**
Effects Technology Inc Santa Barbara CA
TWCP Electron Beam Testing Program. Volume II. Preliminary Characterization of the Blackjack III Pulsed Electron Beam for Material Response Studies.
Final rept. Jul 77-Dec 78,
F. A. Bick. 5 Apr 79, 38p ETI-CR79-610-VOL-2, DNA-5036F-2, AD-E300 843
Contracts DNA001-76-C-0357, DNA001-78-C-0063
See also Volume 3, AD-A086 307.

This volume describes the preliminary characterization of the Maxwell Laboratory Blackjack III pulsed electron beam facility as to energy spectrum, depth-dose profiles and fluence levels and uniformity. These tests were conducted preparatory to obtaining impulse and stress generation data on FM5822A carbon phenolic, and 91-LD phenolic resin. These tests demonstrated the capabilities of the Blackjack III facility for material response studies for peak electron energies of 0.7 to 1.0-MeV with fluence levels less than 200 cal/sq cm.

AD-A086 307/6 PC **A03**/MF **A01**
Effects Technology Inc Santa Barbara CA
TWCP Electron Beam Testing Program. Volume III. Material Response Instrumentation for the Blackjack III Electron Beam Facility.
Final rept. Jul 77-Dec 78,
F. A. Bick. 5 Apr 79, 46p ETI-CR79-610-VOL-3, DNA-5036F-3, AD-E300 844
Contracts DNA001-76-C-0357, DNA001-78-C-0063
See also Volume 4, AD-A086 214.

This volume describes the instrumentation developed to characterize the Blackjack III pulsed electron beam facility environment, and to obtain impulse and stress generation data on FM5822A carbon phenolic, and 91-LD phenolic resin. The primary diagnostical contribution was the development of an in situ fluence measurement technique that significantly reduced experimental uncertainties. Impulse data were obtained using a translating Ronchi ruling and fiber optic light guide. Stress data were obtained simultaneously with the impulse measurements using a laser interferometer. This technique increased the amount of data obtained, and also provides a direct correlation between the impulse and stress data. These gages were all designed to operate in the intense radiation environment associated with a pulsed electron beam machine, and also in the magnetic field (25 kG) used to guide the electron beam.

AD-A086 469/4 PC **A05**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Metallurgy and Mining Engineering
Structure and Deformation Characteristics of Rheocast Metals.
Final rept. 24 Jun 76-23 Jun 79,
R. Mehrabian, F. M. Hosking, F. Folgar Portillo, and R. Wunderlin. Mar 80, 95p AMMRC-TR-80-5
Contract DAAG46-76-C-0046

This report describes work aimed at developing wear resistant composites of aluminum base alloys, using Rheocasting and associated processes. It is anticipated that the feasibility of use of such composites in track blocks of land vehicles would be subsequently determined. Composites of two wrought (2014 and 2024) and one cast (201) aluminum alloys containing 2 to 30 weight percent of Al2O3 and SiC particles in the size range of the 1 to 142 micrometers were prepared using a compositing apparatus developed in this investigation. The non-metals were successfully added and retained in the aluminum alloy matrices using the rheological properties of a partially solidified, vigorously agitated alloy to advantage. Subsequently, the composites were reheated to above their liquidus temperature, shaped and solidified under high pressure in a forging press. The microstructures, the wear behavior and the mechanical properties of the composites were studied. Composites with particulate additions larger tham 5 micrometers in size possessed homogeneous structures. On the other hand, 1 micrometer particles tended to cluster. The wear behavior of the composites was studied on a pin-on-disk type machine built during this investigation. It was shown that composites containing large amounts of non-metals, about 20 wt%, of Al2O3 or SiC exhibit excellent wear resis-

tance and low coefficients of friction. The wear mechanism in the matrices and the composites were also established.

N80-27428/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Moisture Determination in Composite Materials Using Positron Lifetime Techniques.
J. J. Singh, W. R. Holt, and W. Mock, Jr.. Jul 80, 23p NASA-TP-1681, L-13651

A technique was developed which has the potential of providing information on the moisture content as well as its depth in the speciman. This technique was based on the dependence of positron lifetime on the moisture content of the composite specimen. The positron lifetime technique of moisture determination and the results of the initial studies are described.

N80-27429/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Feasibility of Kevlar 49/Pmr-15 Polyimide for High Temperature Applications.
M. P. Hanson. 1980, 16p NASA-TM-81560, E-521
Proposed for Presentation at the 12TH Natl. Sampe Tech. Conf., Seattle, 7-9 Oct. 1980.

Kevlar 49 aramid organic fiber reinforced PMR-15 polyimide laminates were characterized to determine the applicability of the material to high temperature aerospace structures. Kevlar 49/3501-6 epoxy laminates were fabricated and characterized for comparison with the Kevlar 49/PMR-15 polyimide material. Flexural strengths and moduli and interlaminar shear strengths were determined from 75 F to 600 F for the PMR-15 and from 75 F to 450 F for the Kevlar/3501-6 epoxy material. The effects of hydrothermal and long-term elevated temperature exposures on the flexural strengths and moduli and the interlaminar shear strengths were also studied.

SGAE-3012 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Thermal Conductivity of Granules.
W. Neumann, and F. Huebner. Dec 78, 24p ME-151/78
In German.
U.S. Sales Only.

Thermal conductivity measurements of granules became more important particular in regard to their technical application in thermal isolation. Safety considerations in waste management of high level waste need thermal conductivity data of granules also, since a sufficient heat (induced by radiation) release of HLW containing granules have to be guaranteed. The investigations performed based on materials related to the waste management problems. The main task was to study how you can measure thermal conductivity of granule by a longitudinal, comparative heat flow method. Various container materials and forms were used and results obtained were compared. Container made of teflon were found to be most suitable for measurements at temperatures <450 exp 0 K and therefore most of the investigations of calcines were carried out in it. Some estimations based on empirical results or theoretical models are published in this field but none of them corresponds to the conductivity data measured of uncoated and Nickel- or Pyrocarboncoated granules (A1PO sub 4 based, grain size <3 mm). On the other hand complementary measurements of stainless steel balls, in which the parameters are well defined, show a fairly good agreement with results calculated using the equation of Woodside and Messmer. The application of these equations and models developed for porous materials and granules in a gas environment, were tested for metal granules-composites. (Atomindex citation 10:490740)

UCRL-81245 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Epoxy Resin-Elastomer System for Filament Winding.
J. A. Rinde, E. T. Mones, R. L. Moore, and H. A. Newey. 20 Oct 78, 28p CONF-790135-1
Contract W-7405-ENG-48
34. annual conference of the Reinforced Plastic/Composite Inst. New Orleans, LA, USA, 29 Jan 1979.

Tests characterizing an epoxy system that contains 5% rubber and is suitable for wet-filament winding are described. The resin is a bisphenol-A rubberized epoxy diluted with an aliphatic diglycidyl ether and cured with an aromatic amine. The viscosity and pot life were measured and the progress of cure was monitored so an optimum cure could be chosen. Mechanical tests were performed on the cured resin. The low viscosity (0.95 Ps.s) and long pot life (29.3 h) make for ease of processing. A cure cycle of 1.5 h at 90 exp 0 C plus 2 h at 130 exp 0 C gives a cured resin having a glass transition temperature of 104 exp 0 C. The heat-cured material has a tensile strength of 76.1 MPa and a modulus of 2.43 GPa. Kevlar 49 composites of 60-, 65-, and 70-vol % fiber were prepared and tested. Results are presented and compared to two other Kevlar 49/epoxy composites. (ERA citation 04:030912)

11E. Fibers and Textiles

SAND-78-1922C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Effect of Moisture on the Strength of Kevlar 29 Ribbon Parachute Fabrics.
R. H. Ericksen, and L. Orear. 1979, 6p CONF-790308-2
Contract EY-76-C-04-0789
AIAA Aerodynamic Deceleration and Balloon Technology conference, Houston, TX, USA, 5 Mar 1979.

The effect of mositure on the strength of Kevlar 29 ribbon parachute fabrics was investigated. Individual yarn samples and various fabrics were soaked in water for periods of 1 to 30 minutes. Yarn strength did not change; however, fabric strength was reduced. The reductions ranged from 3 to 13% depending upon the fabric construction. Additional experiments eliminated factors such as the weaving process, yarn swelling, and increased abrasion in the presence of moisture as possible mechanisms. Other tests demonstrated that increased interyarn friction occurs when moisture is present. These results suggest that the moisture-enhanced friction restrains highly loaded filaments from adjusting their position and relieving stress concentrations. Specific construction parameters governing the amount of strength reduction were not defined in this study. However, it is evident that moisture effects should be considered in parachute material selection and design. (ERA citation 04:030927)

11F. Metallurgy and Metallography

AD-A086 269/8 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Non-Destructive Evaluation of Defects in Structural Materials Using Long-Wavelength Neutrons.
Technical rept. no. 1,
M. Fatemi, and B. B. Rath. 7 May 80, 18p NRL-MR-4226, AD-E000 438

Small-angle scattering profiles from HSLA steels (Fe-0.05C-1.0Mn-0.12Nb-0.06Al) annealed at various temperatures ranging between 660 C and 1000 C were obtained. The values obtained from Guinier analysis and size distribution calculations were compared with those obtained from electron micrographic observations, and were shown to agree satisfactorily. Similar data were obtained from samples of Ni-P amorphous glasses annealed at 295 deg, 400 deg, and 500 deg C. No crystallization effects were observed from 295 C sample. The Guinier plots of the 400 deg and 500 deg C samples indicate good agreement with the expected behavior due to annealing of the amorphous state; namely, the higher annealing temperatures correspond to larger microcrystallite sizes.

AD-A086 273/0 Not available NTIS
Drexel Univ Philadelphia PA Dept of Mechanical Engineering and Mechanics
An Ultrasonic Nondestructive Test Procedure for the Early Detection of Fatigue Damage and the Prediction of Remaining Life,
James M. Carson, and Joseph L. Rose. 1980, 9p
Contract N00014-77-C-0607
Availability: Pub. in Materials Evaluation, p27-34 Apr 80 (No copies furnished by DTIC/NTIS). Microfiche copies only.

No abstract available.

AD-A086 308/4 Not available NTIS
Naval Research Lab Washington DC
Effects of Stress Ratio and Hold-Time on Fatigue Crack Growth in Alloy 718,
P. Shahinian, and K. Sadananda. Jan 79, 7p
Presented at the Pressure Vessel and Piping Conference, San Francisco, CA, 25-29 Jun 79.
Availability: Pub. in Jnl. of Engineering Materials and Technology, v101 p224-230 Jul 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 309/2 Not available NTIS
Naval Research Lab Washington DC
The Effect of Environment on the Creep Crack Growth Behavior of Several Structural Alloys,
K. Sadananda, and P. Shahinian. 17 Aug 79, 10p
Availability: Pub. in Materials Science and Engineering, v43 p159-168 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 310/0 Not available NTIS
Naval Research Lab Washington DC
Effect of Environment on Crack Growth Behavior in Austenitic Stainless Steels under Creep and Fatigue Conditions,
K. Sadananda, and P. Shahinian. 30 Apr 79, 10p
Availability: Pub. in Metallurical Transactions A, v11A p267-276 Feb 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 427/2 PC **A03**/MF **A01**
Imperial Coll of Science and Technology London (England)
The Role of Hydrogen in the Stress Corrosion Failure of High Strength Al-Zn-Mg Alloys and Sensitized Austenitic Stainless Steels.
Annual technical rept. (Final),
L. Christodoulou, M. G. Lackey, H. M. Flower, F. J. Humphreys, and P. R. Swann. Apr 80, 38p
Grant DA-ERO-77-G-011
See also report dated Jan 78, AD-A052 407.

An investigation into the effect of exposure of Al-Zn-Mg alloys to water vapour has shown that hydrogen, produced by the reaction is absorbed by both the alloy grain boundaries and matrix. The amount of absorbed hydrogen depends on the local chemistry and the metal/Oxide interface and is influenced by alloying additions. Attainment of a critical concentration of dissolved hydrogen in the boundaries leads to brittle intergranular fracture on the subsequent application of stress. Attainment of a critical hydrogen concentration in the matrix leads to transgranular cleavage fracture. Depending upon the alloy composition and heat treatment bubbles of gaseous hydrogen can be formed at suitable sites within the alloys such as grain boundary particles. The formation of grain boundary bubbles reduces embrittlement by reducing the local concentration of dissolved hydrogen. It is proposed that the interaction of stress and environmental variables with the above criteria governs the environmental failure of Al-Zn-Mg alloys in aqueous and water vapour containing environments. It is suggested that such failures are hydrogen embrittlement dominated.

AD-A086 453/8 PC **A04**/MF **A01**
California Univ Berkeley Dept of Materials Science and Mineral Engineering
Modified 43XX Steels for High Toughness.
Final rept. 27 Sep 77-31 Mar 80,
Naresh J. Kar, V. F. Zackay, and E. R. Parker. Apr 80, 70p AMMRC-TR-80-20

Contract DAAG46-78-C-0036

Isothermal transformations were carried out in the vicinity of M sub s temperatures on Si, Al+Si modified AISI 4330, 4340 steels, which had been remelted by electroslag refining (ESR) techniques. The microstructures of the heat-treated variants were characterized by transmission electron microscopy. Mechanical property evaluations (Charpy impact energies, tensile strengths, plane-strain fracture toughness data) of the different microstructures were also carried out. Isothermal transformations in these steels resulted in bainite, bainite + martensite microstructures, containing moderate amounts of retained austenite. The austenite was found to be in the form of thin films around the bainite, martensite laths. The strength-toughness combinations obtained in this investigation for Si-modified AISI 4330 steel appear to be superior to those for unmodified AISI 4340 and 300-M steels, whilst the strength-toughness combinations obtained for Al+Si modified AISI 4340 steel appear to be comparable to those for 18 NiCoMo maraging steel. The merits of ESR-processing these steels are also reflected in the uniform Charpy impact properties obtained for the different orientations investigated. (Author)

AD-A086 472/8 Not available NTIS
Naval Research Lab Washington DC
Effect of Microstructure on Creep-Fatigue Crack Growth in Alloy 718,
K. Sadananda, and P. Shahinian. 6 Aug 79, 24p
Availability: Pub. in Res Mechanica, v1 p109-128 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 511/3 PC **A05**/MF **A01**
Vought Corp Advanced Technology Center Inc Dallas TX
Fatigue and Fracture of Ultrahigh Strength Steel and Titanium Roll-Bonded and Diffusion-Bonded Laminates.
Final rept. 25 Sep 78-25 Mar 80,
L. E. Sloter, and D. H. Peterson. May 80, 79p
Rept no. ATC-R-9200/OCR-31
Contract N00019-78-C-0491

The results of the fabrication by roll bonding of metal-metal laminates and the fatigue and fracture toughness testing of these laminates are reported and discussed. Laminate panels have been prepared from layers of steel alloy 300M interleaved with thin layers of two carbon steels and an ultra-high carbon steel and from Ti-10V-2Fe-3Al interleaved with Ti-15V-3Cr-3Al-3Sn by roll bonding and from Ti-6Al-4V interleaved with commercially pure titanium by diffusion bonding. Both the steel and titanium alloys were heat treated such that their maximum strengths were obtained. Through proper selection of interleaf alloys (thin layers of material bonded between primary layers of the principal alloy) and heat treatment, critical frcture toughness properties were improved by over 100% over the monolithic values at ultimate strength levels of 290 ksi (1999 MPa) for the 300M steel and 190 ksi (1310 MPa) for the Ti-10V-2Fe-3Al. This improvement brought the toughness at these strength levels to values acceptable for damage tolerant service in aerospace structures or other structures requiring high fracture toughness at high strength levels. Furthermore, the fatigue strength of simulated flawed structural items machined from laminated plate was demonstrated to be superior to the equivalent monolithic material for both the steel and titanium alloys. (Author)

AD-A086 543/6 PC **A02**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Scatter of Fatigue Crack Rates in 7XXX Aluminum Alloys.
Technical memo.,
D. G. Ford. Mar 80, 17p Rept no. ARL/STRUC-TM-309

Thirty three crack growth curves were analysed in order to estimate the logarithmic variance of fatigue crack growth rate for several 7XXX Aluminum Alloys in various conditions. The estimated Standard Deviation common to all of these is: s = 0.1241 with 18 degrees of freedom. (Author)

AD-A086 682/2 PC **A04**/MF **A01**
University Coll of Swansea (Wales) Dept of Metallurgy and Materials Technology
Review of European Powder Metallurgy of Superalloys.
Technology assessment rept.,
R. W. Evans. Dec 79, 66p EOARD-TR-80-10

This review is an attempt to summarize the state of research and development in Europe into powder metallurgy of superalloys, and to ascertain which areas of the technology still require attention before the promised advantages of the powder metallurgy route are achieved. Although 'superalloys' are normally taken to be those alloys whose bases are nickel or cobalt, the present review deals with materials which are currently in prospect of production by powder metallurgy and which find use in the hot parts of aeroturbines. Thus it includes an account of some ferritic materials and some titanium alloys. The review deals with disc and blade alloys and discusses powder production, consolidation and the relationships between processing, structure and the final properties of powder alloys. (Author)

AD-A086 697/0 PC **A07**/MF **A01**
Pratt and Whitney Aircraft Group West Palm Beach FL Government Products Div
Plastic Flow and Fracture Processes in Powder Metallurgical Nickel-Base Superalloys.
Final rept. 1 Mar 77-29 Feb 80,
C. C. Law, and M. J. Blackburn. Feb 80, 134p
PWA-FR-13317, AFOSR-TR-80-0468
Contract F49620-77-C-0083

The advent of powder metallurgical methods for nickel-base superalloys has made it possible to use high-strength alloys for large components such as turbine disks. Although much of the manufacturing and process technology for such products is reasonably well understood, many of the features of the structure-property relationships in these alloys remain unclear. This document describes the results of a three-year effort undertaken to provide insight into the factors that control specific properties in advanced powder metallurgical nickel-base superalloys. The first-year effort examined the stress-rupture characteristics of smooth sections of a number of alloys including AF115 and MERL 76. It was concluded that the ability of a material to store dislocations controls the creep rate but that the fracture processes were dictated by grain boundary structures. Models that satisfactorily accounted for the behavior pattern were developed. The second-year effort extended the study to notch-rupture properties which were found to depend upon a larger number of variables. An interesting parallel between short notch lives and the fracture times of smooth sections tested under stress relaxation was found. Based on this observation, certain mechanical cirtieria for poor notch characteristics could be identified.

AD-A086 723/4 PC **A02**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Fatigue-Crack Growth in D6AC Steel Heat-Treated to Different Values of Fracture Toughness,
N. E. Ryan. Apr 79, 21p Rept no. ARL/MAT-110

Measurements of fatigue-crack growth in D6AC steel, heat-treated to various fracture-toughness levels, show that, under conditions where the growth mechanism produces striation markings and the crack extension per cycle is a linear function of a power of the stress intensity range, the rate of fatigue-crack growth is independent of fracture-toughness. At peak stress intensity values greater than 0.7 K sub IC, the rate of growth accelerates as the critical stress intensity is approached and tensile modes of crack extension occur. At peak stress intensity values less than 18 MPa (square root of m), fractographic examination indicates a change in mechanism as the crack extension per cycle decreases more rapidly with decreasing peak stress intensity, approaching a threshold value of stress intensity dependent upon heat-treatment. The implications of these results for the choice of materials for service applications are discussed. (Author)

AD-A086 760/6 PC **A05**/MF **A01**
National Bureau of Standards Washington DC National Measurement Lab
Studies of Microscopic Aspects of Wear Processes in Metals.
Annual rept. 1 Apr-31 Dec 79,
A. W. Ruff, and J. P. Blau. Jun 80, 79p Rept no. NBSIR-80-2058
Contract N00014-79-F-0034

Wear experiments have been conducted in copper alloys and steels under dry sliding conditions in order to study the microscopic aspects of wear and the mechanisms involved. Two experimental wear test systems have been developed: a linear sliding tester and a block-on-ring computer controlled tester. Preliminary findings have compared the wear rates of three different steels, one a high strength-low alloy 'dual phase' steel, and two copper-aluminum alloys. Worn surface and subsurface morphologies have been studied using optical and scanning electron microscopy. Wear debris particles have been recovered from the tests and compared in morphological characteristics between the materials. Mechanical properties measurements of two of the steels were carried out to determine strain hardening characteristics for comparison with wear behavior. Micro-hardness measurements have also been made. Initial wear rate and friction transients for tests in laboratory air and argon have been examined to study processes involved in the early stages of sliding. (Author)

AD-A086 821/6 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
The Influence of Prior Warm Rolling on Fracture Toughness of Heat Treated AISI 52100 Steel.
Master's thesis,
Jeffrey F. McCauley. Mar 80, 83p

An investigation was conducted to determine the effects of prior warm rolling on AISI 52100 bearing steel in the hardened condition. Microstructural and mechanical properties of both standard and warm rolled 52100 were investigated. heat treatments, consisting of both conventional hardening treatments and isothermal transformation treatments, were conducted prior to fracture toughness, hardness, and tensile testing. Conventional hardening treatments resulted in martensitic structures with low toughness; prior warm rolling resulted in the rolled materials exhibiting both higher hardness and toughness than the standard 52100 in the hardened condition. Isothermal transformation treatments resulted in substantially improved toughness, especially in the material processed at 300 C. (Author)

AD-A086 847/1 PC **A04**/MF **A01**
Sussex Univ Brighton (England) School of Engineering and Applied Sciences
Splat-Quenching of Zirconium Alloys, with Special Reference to Martensite and Precipitate Reactions.
Technical rept. May 78-Apr 79,
Srikumar Banerjee. 15 Nov 79, 57p Rept no. TR-3
Grant N00014-78-G-0048

A detailed TEM study is reported of the structure of splat-quenched zirconium alloys as follows: Zr-Nb, various compositions; Zr-27at%Al; Zr-14at%Ni; Zr-24at%Fe. The details of martensite and omega morphology in Zr-Nb, spinodal and precipitation reactions in Zr-Al, and the crystallisation of the amorphous phase in Zr-Ni and Zr-Fe are all fully described. In Zr-FE, a novel morphology is described: a circular core of beta surrounded by six twin-related 'petals' of alpha, forms a 'sunflower' pattern not hitherto reported. (Author)

AD-A086 886/9 PC **A02**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab
Studies of Steel Microstructure by Acoustical Methods,
N. Grayeli, D. B. Ilic, F. Stanke, C. H. Chou, and J. C. Shyne. 1979, 6p GL-3031, AFOSR-TR-80-0522
Grant AFOSR-78-3726
Pub. in Ultrasonics Symposium Proceedings, p273-277 Sep 79.

No abstract available.

AECL-6189 PC **A04**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Neutron-Induced Displacement Damage Analysis (With Particular Reference to Zirconium).
C. H. Woo. Oct 78, 73p

U.S. Sales Only.

Neutron irradiation produces damage in a solid, initially in the form of atomic displacements. As a first step to understanding the effects of irradiation damage in reactor structural materials, information on the initial atomic displacements is necessary. The computer program DISPKAN, based on an extension and generalization of the program RICE, written at ORNL for such calculations, has been developed and installed on the CDC system at CRNL. Using neutron scattering data from ENDF/B files, DISPKAN performs a displacement and PKO analysis on the initial damage caused by neutrons from a given spectrum. The following quantities are calculated: the displacement rate per unit neutron flux, the PKO spectrum, the displacement spectrum, the fraction of PKO's with energy above T, the fraction of displacements produced by PKO's with energy above T, the average PKO energy, the average number of displacements produced per PKO, and the total number of PKO's produced per atom of the solid per unit fluence. The input and output formats of the program are explained. Sample runs are demonstrated. Results for zirconium, exposed to five neutron spectra typically available to experimentalist, are given to illustrate the spectral dependence of the initial displacement events. (Atomindex citation 10:490755)

AERE-R-9290 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Observation of Helium Gas Bubble Lattices in Copper, Nickel and Stainless Steel.
P. B. Johnson, and D. J. Mazey. Oct 78, 14p
U.S. Sales Only.

Transmission electron microscopy is used to investigate the spatial arrangement of the small gas bubbles produced in several fcc metals by 30 keV helium ion irradiation to high dose at 300K. In what is a new result for this important class of metals it is found that the helium gas bubbles lie on a superlattice having an fcc structure with principal axes aligned with those of the metal matrix. The bubble lattice constant, asub(l), is measured for a helium fluence just below the critical dose for radiation blistering of the metal surface. Implantation rates are typically approximately 10 exp 14 He ions cm exp -2 sec exp -1 . The values of asub(l) obtained for copper, nickel and stainless steel are given. Above the critical dose the bubble lattice is seen to survive in some blister caps as well as in the region between blisters. Bubble alignment is also observed in the case of hydrogen bubbles produced in copper by low energy proton irradiation to high fluence at 300K. (Atomindex citation 10:444700)

CEA-CONF-4483 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Irradiation Induced Precipitation: A Thermodynamical Approach.
J. L. Bocquet, and G. Martin. 1978, 36p
U.S. Sales Only.

The purpose of this paper is to evaluate the capability of the thermodynamical approach to account for modifications by irradiation of the mutual stability of the phases of a model binary system. The previous attempts in this direction are first discussed and a solid solution model is presented. The typical behavior which may be anticipated under irradiation is compared with the available experimental results. (Atomindex citation 11:496565)

CEA-R-4926 PC **A09**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. d'Etudes des Combustibles a Base de Plutonium.
Contribution to the Study of Diffusion in Rare Earth Metals and Actinides.
G. Marbach. Jul 78, 187p
In French.These (D. es S.).
U.S. Sales Only.

This work describes several experiments carried out in order to understand the process of self diffusion in rare earth and actinides (self diffusion of body centered cubic gamma neptunium, diffusion of gadolinium in body centered delta cerium, measurement of the activation volume of face centered cubic gamma cerium). The unstable electronic structure of some elements cannot be correlate with anomalous diffusion properties. In fact the diffusion parameters of neptunium and plutonium are similar (high diffusivity and low activation energy) whereas the electronic structure of neptunium is stable and that of plutonium is temperature dependent. The negative activation volume of the body centered cubic phases of plutonium and cerium does not indicate a particular diffusion mechanism since self diffusion is faster under pressure in face centered cubic gamma cerium where a vacancy mechanism is assumed according to earlier results. The vacancy mechanism is the most probable diffusion process in the body centered cubic and compact phases of rare earths and actinides. (Atomindex citation 10:469237)

CEA-R-4930 PC **A10**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Chimie Appliquee.
High-Temperature Oxidation of Iron, Fe-0.5 Wt. % Al and Fe-1 Wt% Al Alloys in CO sub 2 at Atmospheric Pressure.
M. Hoogewys, and J. Paideassi. Dec 78, 211p
In French.
U.S. Sales Only.

The oxidation of several grades of iron (on being a zone-melting grade) in the poly- and monocrystalline forms between 570 and 1150 exp 0 C proceeds along a linear, then a transitory and a parabolic law in correspondence with the growth of wustite possibly covered with magnetite, whereas in the 400-570 exp 0 C range where the parabolic law is rapidly establishing, the scale is entirely formed of magnetite. The oxidation of the two Fe-A1 alloys follows similarly a quasi linear law after a very short linear period. Their weight gains differ only at 10% at most while remaining close to that of iron (except above 570 exp 0 C where they are much lower). The activation energies corresponding to the parabolic process -and in some cases to the linear one- have been determined for each material. They are in the range 11 to 43 Kcal.mole exp -1 , such values being rather low. The characteristics of the oxide layers: mode and facies of nucleation and crystal growth -particularly of the ridges at grain boundaries- the evolution of interfaces, precipitation of magnetite within wustite, etc... have been thoroughly investigated. Finally mechanisms concerning the linear, transitory and parabolic oxidation processes have been proposed after a careful discussion of the results. (Atomindex citation 10:490508)

CEA-R-4936 PC **A07**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Contribution of the Study of Phase Transformations under Irradiation.
A. Barbu. Jan 79, 148p
In French.
U.S. Sales Only.

Irradiation of alloys by neutron or charged particles do not only enhance diffusion but also induce changes in the respective stability of the various phases. Our purpose, is to study appearance conditions of second phase in irradiated undersaturated solid solutions (radiation induced precipitation). NiSi, NiGe, and MgCd solid solutions were irradiated with 1MeV electrons or 500 keV Ni exp + ions. In these alloys, precipitates are easily identified by transmission electron microscopy. We first established the authenticity of the phenomenon. Furthermore we showed that irradiation induced precipitation only in a domain of the dose rate-temperature space: a dose rate threshold exist for radiation induced precipitation. Finally we studied the microstructures. Precipitates are always associated with point defect sinks. Several kinds of theoretical approches have been considered. Only, the solute drag by point defect flux towards the sinks can account for the experimental observations. (Atomindex citation 11:496561)

CEA-R-4941 PC **A07**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Morphological Change of Solids by Vacancy Diffusion under the Effect of Interfacial Tensions and Applied Stresses.
These (D. es S.),
M. F. Felsen. Jan 79, 129p
In French.
U.S. Sales Only.

The morphological change of solids by diffusion under the effect of interfacial tensions and applied stresses is studied by voids annealing and diffusion creep at intermediate and elevated temperatures respectively. In all cases, it has been shown that the evolution kinetic is controlled by vacancy diffusion and that interfaces are ideal sinks. Furthermore, the influence of additional elements on the surface tension of a pure metal is determined for the first time with the voids annealing technique, assuming that the self diffusion coefficient of the metal is not affected by small amount of impurities. The diffusion creep theory is modified to include the interfacial tension effects in the boundary conditions of the diffusion problem which gives a zero creep stress expression very different to those yet published, but the creep equation retains its classical form. The above experiments were carried out using an original device which allows verification of the creep equation to a great precision and to study the range of stresses between Nabarro and Weertman creep. Finally, some creep tests realised on two-phase alloys show that the strain is induced by diffusion. (Atomindex citation 10:493946)

CEA-R-4955 PC **A07**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. d'Etudes des Combustibles a Base de Plutonium.
Elastoresistivity of Impurities in Copper.
G. Delsarte. Dec 78, 133p
In French.Thesis.
U.S. Sales Only.

Among the numerous techniques used to observe impurities or defects in metals, elasto-resistivity has been relatively little used. Uniaxial elasto-resistivity due to substitutional impurities in copper, measured at 4.2 exp 0 K, decreases when the impurity content increases. It is then possible to define a specific uniaxial elasto-resistivity of a given impurity in copper. Measurements have been extended to different temperatures, different rates of cold work (i.e. different dislocation concentrations) and different doses of irradiation (neutron irradiations at 20 exp 0 K). The elasto-resistivity of pure copper at 4.2 exp 0 K does not depend on the cold work performed at 300 K. A rule similar to Matthiessen's rule has been established when two types of defects are present. A correlation between our experiments of uniaxial elasto-resistivity and KONCZYKOWSKI'S measurements of hydrostatic piezoresistivity allows us to give a simple phenomenological description of the behavior of the impurities in the stress: the impurities get longer along the same direction as the elastic matrix. A simple evaluation shows that the elasto-resistivity and the thermo-electric power of an impurity are related. (Atomindex citation 10:490721)

CEGB-RD/B/N-4338 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Effect of Variations in Carbon Activity on the Carburization of Austenitic Steels in Sodium. Exploratory Tests.
J. R. Gwyther, M. R. Hobdell, and A. J. Hooper. Jul 78, 23p
U.S. Sales Only.

Experience has shown that the liquid sodium coolant of fast breeder reactors is an effective carbon-transport medium; the resulting carburization of thin austenitic stainless steel components (eg IHX and fuel cladding) could adversely affect their mechanical integrity. The degree and nature of steel carburization depend, inter alia, on the carbon activity of the sodium environment. Exploratory tests are described in which specimens of austenitic stainless steel were carburized in sodium, the carbon activity of which was continuously monitored by a BNL electrochemical carbon meter. The sodium carbon activity was initially high, but decreased with time, simulating conditions equivalent to plant start-up or coolant clean-up following accidental oil ingress. The extent and nature of steel carburization was identified by metallography, electron microscopy, X-ray crystallography and chemical analysis. (Atomindex citation 10:429608)

CEGB-RD-B-N-4564 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.

Interstitial Loop Growth in Electron Irradiated Vacuum-Remelted FV448.
J. T. Buswell, and S. B. Fisher. May 79, 21p
U.S. Sales Only.

An investigation of the resistance to void swelling of the ferritic steel FV448 has been made in electron irradiation experiments in a High Voltage Electron Microscope. Overaged samples of vacuum-remelted FV448 showed zero swelling after irradiation to doses of up to 30 dpa, in the temperature range 400 to 550 exp 0 C. The resistance to void swelling was due to the absence of mutual interaction between interstitial loops. Impurity segregation to the loops, and precipitation, prevented continuous dislocation climb, thus removing biased sinks from the system at low doses. An interstitial-impurity binding energy of 0.5 eV was measured, suggesting that the impurity responsible was carbon or nitrogen. Some effects attributable to the heating of thin foils in the HVEM environment were detected. (Atomindex citation 10:490716)

CEGB-RD-B-N-4570 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Surface Topography of Some Fatigue Crack Surfaces.
P. T. Manning. May 79, 17p
U.S. Sales Only.

Previous reported work demonstrated that the fluid friction factor could be correlated with surface roughness. This correlation was established for grit-blasted surfaces, but it is also pertinent to establish its relevance to surfaces produced in fatigue cracking, because of the importance of predicting flow rates through such a crack as part of the detectable leak-before-break philosophy. A statistical approach of comparing fatigue crack surfaces with grit-blasted surfaces is described. The approach utilised the power spectrum of each surface, and the comparison showed that the overall shapes of the power spectra for the two types of surface were similar at short wavelengths (below about 0.5 mm) but somewhat different at longer wavelengths. The effects of this difference at the longer wavelengths is currently unknown. The similarity at the shorter wavelengths indicates that, in this region of the spectrum, fatigue crack roughness can be adequately modelled by grit blasted surface for the purpose of establishing the effects of surface roughness on gas flow rates. (Atomindex citation 11:497045)

DOE/ER/10430-1 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park.
Hydrogen Absorption in Metals: A Field Ion Microscopy Study. Progress Report, June 1, 1979-May 31, 1980.
T. Sakurai, and H. W. Pickering. Feb 80, 9p
Contract AC02-79ER10430

Progress is summarized in: sample preparation, computer interfacing for automated data acquisition and computer simulation of ion optics of atom-probes, in addition to the actual chemical compositional anaysis of the Fe-Ti alloy samples and observations on hydrogen-induced microcracking. It is found that Ti segregates at the surface and grain boundaries when heated to and above 800 exp 0 C. Some of the Ti atoms form clusters with carbon, nitrogen and oxygen as a nucleus. The formation and propagation of a microcrack involving hydrogen was documented for the first time on a truly atomic scale. (ERA citation 05:024386)

INIS-mf-4733 PC **A04**/MF **A01**
Rice Univ., Houston, TX.
Thermodynamics and Kinetics of Interstitial Solid Solutions.
Tese (Ph.D.).
J. R. G. da Silva. Apr 76, 72p
U.S. Sales Only.

Studies of hydrogen metal systems where the hydrogen is disolved in a solid solution are presented. Particular items of interest are: the thermodynamics of the hydrogen-iron system; the solubility of hidrogen in super pure iron single crytals; the thermodinamic functions of hydrogen in solid solutions of Nb, Ta and V; and the solubility of hydrogen in alpha -manganese. The diffusion of carbon and nitrogen in BCC iron is also studied. (Atomindex citation 10:428032)

INIS-mf-4881 MF **A01**
Topical Problems of Crackability in Weld Annealing of Low-Alloyed Pressure Vessel Steels.
M. Holy, and O. Brhlik. Oct 77, 226p CONF-7710212-
In Czech.17. welding conference CSSR, Strbske Pleso, Czechoslovakia, 30 Oct 1977.
U.S. Sales Only. Microfiche copies only.

The following method was developed for determining annealing crackability: A sharp notch was made in the middle of the bodies of rods imitated in a welding simulator. Chucking heads were modified such as to permit chucking a rod in an austenitic block by securing the nut. Prestress was controlled by button-headed screw adapters. The blocks were made of 4 types of austenitic steels with graded thermal expansivity coefficients, all higher than that of the tested low-alloyed steel rod. The blocks with rods were placed in a furnace and heated at a rate of 100 degC/h. As a result of the larger austenite block diameter the rod began to be stretched and at some temperature of more than 500 degC it was pulled apart. The risk of annealing crackability of welded joints may be reduced by the choice of material and melt and by the technology of welding, mainly by the choice of a suitable addition material in whose weld metal the plastic deformation preferably takes place in annealing. (Atomindex citation 10:451641)

Juel-Spez-38 PC **A06**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung.
Temperature Dependence of the Anisotropy of the Threshold Energy for Defect Production in Platinum.
N. Afify. May 79, 106p
U.S. Sales Only.

Platinum single crystals were irradiated with fast electrons along various crystallographic directions to determine the anisotropy of the damage rate by resistivity measurements. The important results of this work are as follows: 1.) The anisotropy of the damage rate in platinum increases with increasing temperature. 2.) Fitting of the damage rate data by a threshold energy profile indicates that zones of minimum threshold energy are around the < 110 > and < 100 > direction, while the maximum threshold energy is found around the direction < 111 >; with increasing temperature the area of the zones with small threshold energy around the close-packed directions < 110 > and < 100 > decreases. 3.) The increasing anisotropy of the threshold energy with temperature is explained by two mechanisms: a) The change in the defect pattern between 4.5 K and 40 K due to the instability of close pairs and the defocusing of replacement sequences by thermal lattice vibration. 4.) No safe statements about the temperature dependence of the minimum and the average displacement energy are possible. (Atomindex citation 11:503507)

KFTI-77-11 PC **A06**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Proceedings of the Conference on Pure Metal Production and Study of Their Properties.
1977, 112p
U.S. Sales Only.

Individual papers were abstracted separately. (Atomindex citation 10:435991)

KFTI-78-62 PC **A05**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Low Temperature Radiation Embrittlement for Reactor Vessel Steels. Analytical Review.
I. A. Ginding, and L. A. Chirkina. 1978, 80p
In Russian.
U.S. Sales Only.

General conceptions of cold brittleness of bcc metals are in a review. Considered are experimental data and theoretical representations about the effect of irradiation conditions, chemical composition, phase and structural constitutions, grain size, mechanical and thermomechanical treatments on low-temperature irradiation embrittlement of reactor vessel steels. Presented are the methods for increasing radiation stability of metals (carbon and Cr-Mo steels) used in manufacturing reactor vessels. (Atomindex citation 11:496575)

ND-R-152(S) PC **A03**/MF **A01**
UKAEA, Risley. Nuclear Power Development Labs.
Some Observations of the Corrosion of Zircaloy-4 as Compared with Zircaloy-2 in Reactor and Autoclave Environments.
F. W. Trowse. Sep 78, 30p
U.S. Sales Only.

The corrosion behaviour of Zircaloy-4 in autoclaves, in the X-6 loop of the Canadian NRX reactor, and in the Winfrith SGHWR is reported. The only significant difference between Zircaloy-4 and Zircaloy-2 were that the hydrogen uptake in autoclave tests was lower for Zircaloy-4, but Zircaloy-4 was rather more susceptible to loss of oxide by spalling in certain conditions, and on two occasions Zircaloy-4 suffered uniquely high corrosion rates. (Atomindex citation 10:429614)

N80-27473/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Critical Points of Alloys of Iron and Cobalt During Rapid Heating.
V. N. Gridnev, and S. P. Oshkaderov. Apr 80, 7p
NASA-TM-75825
Contract NASW-3198
Transl. Into English from Metallofizika (USSR), No. 27, 1970 p 80-84. Original Language Document Was Announced as A70-36203. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The influence of the rate of heating on the position of the critical points of iron-cobalt alloys was studied. It is shown that when an alloy with 8% Co by weight is heated at the rate of 7000 deg/sec, a shift in the temperature of phase conversion of almost 30 deg occurs. When an alloy with 15% Co by weight is heated at the same rate, the conversion temperature is shifted by approximately 20 deg. For an alloy with 15% Co by weight, for which under ordinary conditions of heating the points of phase conversion and magnetic randomization (the Curie point) coincide, it was possible to show that for high rates of heating, a separation with respect to temperature occurs which clearly confirms the fact of the shift in the critical points of phase conversion.

ORNL/TM-7193 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Experimental Observations of Effects of Inert Gas on Cavity Formation During Irradiation.
K. Farrell. Apr 80, 41p CONF-7909134-1
Contract W-7405-ENG-26
Consultant symposium on rare gases in metals and ionic solids, Harwell, UK, 10 Sep 1979.

Cavity (void) formation and swelling in non-fissile materials during neutron irradiation and charged particle bombardments are reviewed. Helium is the most important inert gas and is primarily active as a cavity nucleant. It also enhances formation of dislocation structure. Preimplantation of helium overstimulates cavity nucleation and gives a different temperature response of swelling than when helium is coimplanted during the damage process. Helium affects, and is affected by, radiation-induced phase instability. Many of these effects are explainable in terms of cavity nucleation on submicroscopic critical size gas bubbles, and on the influence of the neutral sink strength of such bubbles. Titanium and zirconium resist cavity formation when vacancy loops are present. (ERA citation 05:024423)

ORO-3912-101-112 PC **A99**/MF **A01**
North Carolina State Univ. at Raleigh.
Computer Experiment Studies on Mechanisms for Irradiation Induced Defect Production and Annealing Processes. Final Report.
J. R. Beeler, Jr., and M. F. Beeler. Jun 79, 885p
Contract EY-76-C-05-3912

This research is based on pair potentials used in the Brookhaven work. It extends their use in defect production simulations to the 5 MeV range and characterizes the short term annealing of the primary defect states. Defect properties and interactions are studied. Defect interactions include carbon, helium, and misfit metallic substitutional impurity interactions with vacancy and interstitial defects as well as vacancy-vacancy, interstitial-interstitial and vacancy-interstitial interactions. (ERA citation 05:003373)

PAT-APPL-6-019 808 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Ductile Alloy and Process for Preparing Composite Superconducting Wire.
Patent Application,
J. D. Verhoeven, D. K. Finnemore, E. D. Gibson, and J. E. Ostenson. Filed 12 Mar 79, 16p
Contract W-7405-ENG-82
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An alloy for the commercial production of ductile superconducting wire is prepared by melting together copper and at least 15 weight percent niobium under non-oxygen-contaminating conditions, and rapidly cooling the melt to form a ductile composite consisting of discrete, randomly distributed and oriented dendritic-shaped particles of niobium in a copper matrix. As the wire is worked, the dendritic particles are realigned parallel to the longitudinal axis and when drawn form a plurality of very fine ductile superconductors in a ductile copper matrix. The drawn wire may be tin coated and wound into magnets or the like before diffusing the tin into the wire to react with the niobium. Impurities such as aluminum or gallium may be added to improve upper critical field characteristics. (ERA citation 05:029439)

PAT-APPL-6-024 339 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Salt-Soda Sinter Process for Recovering Aluminum from Fly Ash.
Patent Application,
W. J. McDowell, and F. G. Seeley. Filed 27 Mar 79, 10p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method for recovering aluminum values from fly ash comprises sintering the fly ash with a mixture of NaCl and Na sub 2 CO sub 3 to a temperature in the range 700 exp 0 to 900 exp 0 C for a period of time sufficient to convert greater than 90% of the aluminum content of the fly ash into an acidsoluble fraction and then contacting the thus-treated fraction with an aqueous solution of nitric or sulfuric acid to effect dissolution of aluminum and other metal values in said solution. (ERA citation 05:029262)

PAT-APPL-6-074 288 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Method for Inhibiting Corrosion of Nickel-Containing Alloys.
Patent Application,
J. H. DeVan, and J. E. Selle. Filed 11 Sep 79, 14p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Nickel-containing alloys are protected against corrosion by contacting the alloy with a molten alkali metal having dissolved therein aluminum, silicon or manganese to cause the formation of a corrosion-resistant intermetallic layer. Components can be protected by applying the coating after an apparatus is assembled. (ERA citation 05:029323)

PB80-201262 Not available NTIS
National Bureau of Standards, Washington, DC.
Radiance Temperature of Vanadium at its Melting Point.
Final rept.,
A. Cezairliyan, A. P. Miller, F. Righini, and A. Rosso. 1979, 12p
Sponsored in part by Air Force Office of Scientific Research, Bolling AFB, DC.
Pub. in High Temperature Science. An International Jnl. 11, p223-232 1979.

The radiance temperature (at two wavelengths, 653 and 993 nm) of vanadium at its melting point was measured using a subsecond-duration pulse heating technique. Specimens in the form of strips with initially different surface roughnesses were used. The results do not indicate any dependence of radiance temperature (at the melting point) on initial surface or system operational conditions. The average radiance temperature at the melting point of vanadium is 1992 K at 653 nm and 1875 K at 993 nm, with a standard deviation of 1.2 K at 653 nm and 0.3 K at 993 nm. The total inaccuracy in radiance temperature is estimated to be not more than plus or minus 7 K.

PER-36 PC **A02**/MF **A01**
Atomic Energy Board, Pelindaba, Pretoria (South Africa). Engineering Services Div.
Recovery of Uranium, Gold and Sulphur from Residues from South African Mines.
P. D. Toens. Oct 78, 4p
U.S. Sales Only.

The slimes dams resulting from the operations of gold and gold/uranium mines situated within the Witwatersrand Basin contain low concentrations of gold, uranium and pyrite. As a result of a marked increase in the prices of both gold and uranium in recent years, two schemes involving the recovery of these minerals also the manufacture of sulphuric acid as a by-product are operating profitably. Further schemes are under investigation. (Atomindex citation 10:429624)

PNL-TR-372 PC **A02**/MF **A01**
Crystallization and Irradiation Effects in an Amorphous Alloy of the Type Fe sub 40 Ni sub 38 Mo sub 4 B sub 18.
N. Azam, L. Le Naour, C. Rivera, P. Grosjean, and P. Sacovy. 1979, 16p
Contract EY-76-C-06-1830
A, J. Nucl. Mater. 83 P298-304 1979.

The structure of an amorphous alloy of the composition Fe sub 40 Ni sub 38 Mo sub 4 B sub 18 either in the untreated fabricated state, or after various thermal treatments, or after irradiation with heavy ions was studied. The amorphous state is not modified by heat treatments at temperatures below 300 exp 0 C. After several hours at 350 exp 0 C, crystallization begins by forming crystals of an FeNi-base solid solution. The crystallization is complete after a two-hour treatment at 500 exp 0 C. This alloy, bombarded with 500-keV Ni exp + ions, proved to be practically insensitive to irradiation at the ambient temperature at high doses (6 x 10 exp 16 ions/cm exp 2 , i.e., approximately 100 dpa). A 100 to 150 exp 0 C lowering of the crystallization temperature was observed under irradiation. (ERA citation 05:005997)

RFP-2891 PC **A02**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Corrosion of delta Plutonium in Rocky Flats Tap Water.
A. E. Hodges, III, J. J. Reynolds, and J. M. Haschke. 10 Sep 79, 9p
Contract EY-76-C-04-3533

Corrosion rates were established by measuring the weight loss of a sample completely immersed in tap water for specified periods of time. Tests were conducted for periods ranging from 21 to 1824 hours at ambient temperature in sealed 125-ml containers. The weight changes observed revealed that the corrosion of delta plutonium by tap water in a closed system occurs through two separate processes. Each results in a different average corrosion rate. Initially a typical diffusion-controlled surface reaction was observed which resulted in an average corrosion rate of 0.264 mg(cm exp 2 .h). The second corrosion process begins when cracking and flaking of the corrosion product layer occurs. This results in an increase in the corrosion rate to 0.52 mg/(cm exp 2 .h). 3 figures, 2 tables. (ERA citation 05:001448)

RFP-2897 PC **A04**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Forging Evaluaion of 304L Stainless Steel.
C. L. Packard, and C. M. Edstrom. 29 Oct 79, 64p
Contract EY-76-C-04-3533

The objective of this project was to evaluate and characterize the effects of various forging parameters on the metallographic structure and mechanical properties of 304L stainless steel forgings. Upset and die forgings were produced by hammer and Dynapak forging with forging temperatures ranging from 760 to 1145 exp 0 C, upset reductions ranging from 20 to 60%, and annealing times ranging from 0 to 25 minutes at 843 exp 0 C. The carbide precipitation behavior observed was found to be a function of forging temperature and annealing time. Higher forging temperatures were beneficial in avoiding continuous carbide precipitation and annealing at 843 exp 0 C promoted increased carbide precipitation. The yield strength of the unannealed forgings decreased with increasing forging temperature and, with the exception of the 1145 exp 0 C upset forgings, was significantly lowered by annealing. (ERA citation 05:004732)

RFP-2919 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Corrosion of delta Plutonium by Synthetic Sea Water.
A. E. Hodges, III, and J. M. Haschke. 24 Oct 79, 14p
Contract EY-76-C-04-3533

Tests have been performed to determine the corrosive nature of sea water on delta plutonium at 25 exp 0 C. Corrosion rates were determined by measuring the time dependence of mass loss at constant pressure and the time dependence of hydrogen evolution in a sealed vessel. Test coupons were completely immersed in a standard solution of synthetic sea water for periods ranging from 1 hour to 144 hours. Weight loss measurements show that delta plutonium corrodes at an average rate of 5.01 mg/(cm exp 2 hr) while hydrogen is formed at an average rate of 1.6 x 10 exp -5 mol/(cm exp 2 hr). The corrosion process is a hydrolysis reaction that produces hydrated plutonium(IV) oxide and hydrogen. The reaction apparently occurs along the grain boundaries of the metal. (ERA citation 05:003357)

RFP-2925 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Segregation Effects in JBK-75.
M. C. Mataya, C. M. Edstrom, R. W. Krenzer, and J. H. Doyle. 21 Dec 79, 37p
Contract EY-76-C-04-3533

Chemical segregation of alloying elements, can be a severe problem in complex alloys. Many problems have been experienced with developing fabrication processes for JBK-75 and it is suggested that these difficulties may be related in part to the degree of chemical heterogeneity that exists in the alloy. Early testing and qualification of the alloy was made on relatively homogeneous samples, which came from small diameter ingots. In large size ingots used for production, it is more difficult to achieve a uniform distribution of alloying elements in the product; resulting in greater variability of alloy properties which are difficult to explain. Extensive microprobe measurements were made on samples of JBK-75 bar stock from several different production size ingots. It was found that segregation of titanium is a common occurrence. Titanium banding can be controlled by ingot melting rate and homogenization of ingot or intermediate product. A model for titanium diffusion shows that homogenizing at the ingot stage is ineffectual with respect to the spacing measured. However, homogenizing 20.3-cm diameter intermediate product, where band spacing is reduced, will significantly reduce segregation. The effect of segregation on tensile properties is discussed. Segregation may have a significant influence on forgeability of JBK-75. Forgeability tests show that microstructure plays an important role in the ability of JBK-75 to deform homogeneously, and microstructure is controlled by chemical uniformity of the alloy. Inhomogeneous shear during forging can cause adiabatic shear planes to form, and these have been observed in JBK-75. (ERA citation 05:008833)

SAN-0034/172-1 PC **A11**/MF **A01**
California Univ., Los Angeles. School of Engineering and Applied Science.
High Temperature Irradiation Damage in Nickel-Chromium Solid Solutions.
R. F. Pinizzotto, Jr. Aug 78, 227p UCLA-34P172-26
Contract EY-76-S-03-0034-172

Metals have been observed to swell, i.e., increase in volume when exposed to large fluxes of energetic particles at high temperatures. The swelling be-

havior of pure metals and commercial alloys is generally well characterized, but data on swelling in binary alloys are rare. The results presented in this report are among the first in-depth studies of void swelling as a function of solute content. Pure Ni and Ni-Cr solid solutions containing up to 16% Cr were irradiated using heavy charged particles to simulate the radiation damage caused by neutron bombardment. Experiments were performed using either exp 14 N sub 2+ or exp 58 Ni exp +, accelerated to energies of 0.4 MeV (nitrogen ions) or 3.0 MeV and 3.5 MeV for nickel ions. Samples were irradiated between 500 and 700 exp 0 C, which correspond to 0.4 to 0.6 of the melting points of these materials. The specimens were exposed to a maximum damage level of 20 dpa, calculated using the computer code of Manning and Mueller. The irradiation induced microstructures were characterized. The main components of the microstructure are a great number of voids that cause macroscopic volume increases and a dislocation distribution consisting of perfect dislocations and faulted dislocation loops. The parameters chosen to characterize these features are the void volume fraction, the mean void diameter, the void number density, and the dislocation density. The variations of the microstructural parameters were examined as functions of the Cr content, the irradiation temperature, the total irradiation dose, the type of incident ion and the sample configuration (i.e., electron transparent foils or bulk samples). (ERA citation 05:008877)

SAND-79-1220C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Properties and Applications of Ion-Implanted Alloys.
S. M. Myers. 1979, 28p CONF-791013-8
Contract EY-76-C-04-0789
26. national vacuum symposium, New York, NY, USA, 2 Oct 1979.

Ion implantation is a controlled and versatile means for near-surface alloying of metals. Supersaturated solutions, metastable compounds, amorphous phases, and equilibrium alloys have been produced. Uses include the investigation of new metastable phases, characterization of alloying reactions occurring in conventional materials, and improvement of surface properties such as hardness, wear, and corrosion. A brief review is given of the physical processes occurring during ion implantation, the types of alloys which result, and representative applications. (ERA citation 05:001356)

SAND-79-8041 PC **A02**/MF **A01**
Sandia Labs., Livermore, CA.
Corrosion Resistance of Zinc-Nickel Plated U-0.75 Ti.
J. W. Dini, and H. R. Johnson. Sep 79, 21p
Contract EY-76-C-04-0789

As part of a program for the US Army directed at improving the corrosion performance of U-0.75 Ti, specimens were coated with Zn-10 Ni alloy electroplate and then subjected to various corrosion tests. This work revealed that the Zn-Ni coatings provided good protection for U-0.75 Ti in salt fog and in non-sealed moist-nitrogen systems. In sealed, moist-nitrogen environments the Zn-Ni coatings deteriorated quickly and provided no protection. Some plating with Zn alone, using some of the new non-cyanide plating solutions, was also attempted, but the results were inconsistent. (ERA citation 05:001449)

SAND-79-8232 PC **A02**/MF **A01**
Sandia Labs., Livermore, CA.
Influence of Purity Level on the Mechanical Properties of Hot Isostatically Pressed Beryllium.
B. C. Odegard, Jr. Sep 79, 18p
Contract EY-76-C-04-0789

The procurement of a quantity of ultra-pure beryllium: powder combined with special handling from powder to billet form resulted in the fabrication of high purity beryllium. The mechanical properties of these billets were contrasted to those of commercial grade billets to determine the influence of impurities and powder processing. The tensile test results show that the strength values are primarily dependent on the grain size in a behavior predictable by the Hall-Petch relationship. Only a fraction of the strength differential can be attributed to metallic impurities in solution. The grain size is controlled by the powder size distribution. The ductility is dominated by both grain size and oxide content. The fine grained, low oxide billets exhibited the highest ductilities. There is evidence to suggest that oxide distribution has a large influence on the ductility. The fracture toughness was highest for the high purity beryllium billets. (ERA citation 05:001357)

SAND-79-8651 PC **A02**/MF **A01**
Sandia Labs., Livermore, CA.
Scanning Auger Analysis of Surface Segregation in 21-6-9 and JBK-75.
R. H. Stulen. Oct 79, 19p CONF-7906113-2
Contract EY-76-C-04-0789
Conference on surface studies, Golden, CO, USA, 26 Jun 1979.

Measurements of surface segregation have been carried out on two austenitic stainless steels: Fe-21Cr-6Ni-9Mn and JBK-75. Highly polished polycrystalline samples of each material have been heated in-situ in an ultra-high vacuum system to temperatures ranging from 400 exp 0 to 800 exp 0 C and examined at temperature using scanning Auger spectroscopy. The results for 21-6-9 show that segregation is strongly heterogeneous with isolated regions enriched in either nitrogen, sulfur or tin. Above approximately 700 exp 0 C the surface composition becomes strongly enhanced in both nitrogen and boron. For JBK-75 the surface is seen to be enriched in both titanium and nickel. Co-segregation effects and the relationship between surface and bulk composition resulting from exposure to elevated temperature are presented. (ERA citation 05:007379)

UCID-18179 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Mechanical Properties of Cold-Worked 5083 Aluminum.
M. E. Prado, and J. J. Scott. 6 Mar 79, 16p
Contract W-7405-ENG-48

Tensile and fracture-toughness tests of 25%-cold-worked 5083 aluminum and weld material were conducted. The tests showed that the aluminum is highly nonhomogeneous; its fracture toughness, elongation, and percent reduction in area varied greatly from point to point. This characteristic could significantly affect the design of 5083 applications. The weld material exhibited more uniform mechanical properties throughout the weld. However, its fracture toughness varied from 19 to 49 ksi.in./sup 1/2/. The weld-joint geometry affects the fracture characteristics of the joint. (ERA citation 05:008847)

WAPD-TM-1425 PC **A03**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Evaluation of the Mechanical Properties of an Irradiated Type 347 Stainless Steel in-Pile Tube with a Peak Fluence of 4 X 10 exp 22 n/cm exp 2 (>1 MeV).
J. J. Krupowicz. Aug 79, 45p
Contract EY-76-C-11-0014

Results of postirradiation mechanical testing of Type 347 stainless steel specimens machined from an Engineering Test Reactor in-pile pressure tube are presented. Tests included tensile and fracture toughness at room temperature, 600 exp 0 F, 800 exp 0 F, and 1000 exp 0 F, room temperature fatigue, and delayed failure stress rupture with stresses approaching the yield stress. Immersion density measurements were also made. Specimen fluences varied up to 4 x 10 exp 22 n/cm exp 2 (>1 MeV). Although irradiation increased the strength, the material remained ductile and showed no evidence of notch or strain rate sensitivity, or embrittlement. Static and dynamic fracture toughness values were well above the minimum failure criterion requirements. At higher fluence all of the mechanical properties appear constant, indicating saturation of the irradiation damage. Extended in-pile service of such in-pile pressure tubes to 4 x 10 exp 22 n/cm exp 2 (>1 MeV) was justified. (ERA citation 05:004756)

11l. Plastics

AD-A086 393/6 MF **A01**
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
Semiconducting and Metallic Organic Polymers: Chemically Doped Polyacetylene, (CH)x.
Technical rept.,
Alan G. MacDiarmid, and Alan J. Heeger. 1979, 28p Rept no. LRSM-TR-79-1
Contract N00014-75-C-0962
Pub. in Lecture Notes in Physics, v96 p361-383 1979.
Availability: Microfiche copies only.

No abstract available.

AD-A086 748/1 PC **A03**/MF **A01**
Dow Corning Corp Midland MI Advanced Research Lab
Cyclic Fluorosilicone Polymers and Copolymers.
Final rept. 1 Jan 77-31 Jan 80,
O. R. Pierce, and K. M. Lee. 1980, 37p AFOSR-TR-80-0469
Contract F49620-77-C-0012

Several reactions were examined as potential routes to reactive cylic tetrasiloxanes and their precursors. The reactions examined in some detail were cohydrolysis, siloxy-chloride exhange, hydorlysis of triple bond SiCl, triple bond SiOMe and triple bond SiH and acetoxy-silanol condensations. Using these reactions several intermediates were prepared and the new compounds were characterized.

AD-A086 804/2 PC **A03**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB OH
Model Compound Studies of Rigid Rod Aromatic Heterocyclic Polymer Systems. Part I. The Crystal and Molecular Structures of 2,6-Diphenylbenzo (1,2-d:4,5-d') Bisthiazole & 2,6-Diphenylbenzo (1,2-d:5,4-d') Bisoxazole.
Final rept. Apr 77-Apr 78,
M. W. Wellman, W. W. Adams, D. R. Wiff, and A. V. Fratini. Feb 80, 28p Rept no. AFML-TR-79-4184-PT-1

The x-ray crystal structures of two monomeric model compounds for polybisbenzoxazole (PBO) and polybisbenzthiazole (PBT) are presented. The PBO model compound molecules stack along the b crystallographic axis in two vertical columns of differing orientation and are inclined to b by an angle of 36 deg. The repeat distance along b is 5.94A and the perpendicular distance between adjacent molecules in a particular stack is 3.4A. The PBT model compound molecules stack most efficiently along its b crystallographic axis with an inclination angle of 36.8 deg. Adjacent molecules along c exhibit a crossing pattern with a dihedral angle of 73.6 deg. The relationship between the model compound structures and the gross packing features of polymer chains in PBO and PBT are discussed. (Author)

AD-A086 866/1 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Triaxially Woven Fabrics of Kevlar, Dacron Polyester and Hybrids of Kevlar and Dacron Polyester.
Final rept.,
Eleanor Th. Vadala. 3 Apr 80, 20p Rept no. NADC-80020-60

To provide data for possible LTA (Lighter Than Air) application, four triaxially woven fabrics were made using yarns of: (1) Kevlar aramid, (2) Dacron polyester and (3) hybrids of aramid and polyester. The woven triaxial fabrics were coated with urethane. The material samples were characterized by removal and test of specimens. The test matrix included creasing and environmental conditioning tests. (Author)

AD-A086 869/5 PC **A03**/MF **A01**
Pennsylvania Univ Philadelphia
Conducting Organic Polymers: Doped Polyacetylene.
Interim technical rept.,
Alan J. Heeger, and Alan G. MacDiarmid. 24 Nov 79, 45p Rept no. TR-79-10

Contract N00014-75-C-0962
Presented at the Advanced Study Institute on the Physics and Chemistry of Low Dimensional Solids, Tomar, Portugal, Aug 79.

Linear polyacetylene, (CH)x is the simplest conjugated organic polymer and is therefore of special fundamental interest. Interest in this semiconducting polymer has been stimulated by the successful demonstration of doping with associated control of electrical properties over a wide range; the electrical conductivity of films of (CH)x can be varied over 12 orders of magnitude from that of an insulator (sigma approximately equal to ten to the minus 9th power/ohm/cm) through semiconductor to a metal (sigma approximately equal to ten to the minus 13th power/ohm/cm). Various electron donating or accepting molecules can be used to yield n-type or p-type material, and compensation and junction formation have been demonstrated.

IEA-DT-069 PC **A03**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Preparation of Plastic-Cellulose Compounds by High Energy gamma Radiation.
Thesis,
M. C. F. Rosa. Aug 78, 47p
In Portuguese.
U.S. Sales Only.

The use of high intensity sources of ionizing radiation for inducing polymer cross-linking was studied and the feasibility of its application in making plastic and cellulose combined compounds, particularly plates formed by paper sheets aglutinated with polyester resin, was analyzed. Several types of paper capable of being used in the plate composition were tested. It was verified that with the preparation technique used in this work the ordinary filter paper gave the best results. By different material testing techniques it was found that the chemical and mechanical properties of plates cured with radiation doses of about 1.5 Mrad are favorably compared with those exhibited by plates of equal composition, cured by the classic method (adding chemical initiator and accelerator). (Atomindex citation 10:430464)

PB80-199870 Not available NTIS
National Bureau of Standards, Washington, DC.
Absorbed Dose Distributions in Irradiated Plastic Tubing and Wire Insulation.
Final rept.,
A. Miller, and W. L. McLaughlin. 1979, 9p
Pub. in Trans. International Meeting on Radiation Processing, Radiation Physics and Chemistry (2nd), Roskilde (Denmark), November 16-19, 1978, Radiat. Phys. Chem. 14, p525-533 1979.

Plastic tubing and wire insulation were simulated by radiochromic dye dosimeter films having electron absorbing properties similar to the materials of interest (polyethylene and PVC). A 400-keV electron accelerator was used to irradiate from 1, 2, 3, and 4 sides simulating possible industrial irradiation situations. The results indicate that in most cases it is necessary but also sufficient to irradiate from two opposite sides.

SAND-79-6005 PC **A02**/MF **A01**
Method for Preparing Macromolecular Polyoxymethylene.
L. V. Barbare, F. I. Dubovitsky, and A. N. Dremin. 27 Nov 79, 11p
Contract EY-76-C-04-0789
C.

The present invention is concerned with the methods for preparing macromolecular polyoxymethylene (polyformaldehyde) from crystalline trioxane. A method for preparing macromolecular polyoxymethylene from polycrystalline trioxane by means of shock compression is already known. One of the drawbacks of this method is that the polyoxymethylene produced exhibits a relatively low degree of crystallinity and low molecular weight, which may cause this material to lack sufficient mechanical strength and wear resistance. Another drawback of this method is its low yield of the final product. The object of this invention is to eliminate these disadvantages. To this aim, using a method for the preparation of macromolecular polyoxymethylene in which the raw material is polymerized by shock compression, it became necessary to modify the raw material so as to obtain polyoxymethylene having higher crystallinity and molecular weight and, consequently, higher mechanical strength and greater wear resistance. According to this invention this problem is solved by using monocrystalline trioxane instead of crystalline trioxane. (ERA citation 05:008889)

SGAE-2863 PC **A03**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Weatherability of Radiation-Crosslinked, Stabilized Polyethylene.
R. Schaudy, H. Kalteis, E. Proksch, H. Hubeny, and E. Schmitz. Dec 77, 40p CH-224/77
In German.
U.S. Sales Only.

From polyethylene (LDPE) and 18 different stabilizers 24 mixtures were prepared and a part of the injection-molded plates made therefrom were crosslinked by electron radiation. Irradiated and unirradiated plates have been weathered in a height of 1200m up to 3 years. On the samples removed after 1, 2 and 3 years, respectivley, there were determined tensile strength, elongation at break and gel content. On some selected samples the thermal behaviour was examined. The tensile strength was lowered in most cases regardless of the original degree of crosslinking. The elongation at break was reduced drastically in most samples. The gel content of the crosslinked samples was reduced during ageing, in part to a considerable degree, whereas the originally unirradiated plates revealed a relatively strong crosslinking (20-30% gel), which can be explained best by hydrogen bonding between the carboxyl groups formed by oxidation. Good protection against ageing was given only by 3 kinds of soot (carbon black) and by Tinuvin 327. All the other stabilizers turned out to be rather inefficient. This can be in part attributed to the loss of stabilizer by migration. (Atomindex citation 09:414089)

11L. Wood and Paper Products

PB80-201031 PC **A03**/MF **A01**
North Carolina State Univ. at Raleigh. Dept. of Wood and Paper Science.
An Integrated Approach to the Conversion of Lignocellulose from Wood into Useful Chemicals. Summary Report: Preliminary Process Design,
Irving S. Goldstein. Apr 80, 33p NSF/RA-800063
Grant NSF-PFR77-12243
See also PB-301 059.

This report describes an integrated process for the hydrolysis of wood using super-concentrated hydrochloric acid. The process has been simulated using the General Energy and Material Balance System (GEMS) computer system to examine the preliminary process design and to perform process analysis calculations. These computer assisted calculations enable easy and rapid evaluation of process operating variables and economic sensitivity analysis. A process flowsheet depicts an integrated hydrochloric acid wood hydrolysis plant that processes 1,100 oven-dry-tons per day producing furfural, acetic acid, ethanol, and lignin residue. Plant economics studies estimate a capital investment of $94 million, annual operating expenses of $35 million, revenues of $75 million, and an after tax return on investment of 16 percent. The effect on the process of changing acid recovery efficiency has been examined. Co-product credits are crucial to the economic feasibility of the integrated wood chemicals plant.

PB80-201403 PC **A06**/MF **A01**
Washington Univ., Seattle. Coll. of Forest Resources.
Chemicals from Western Hardwoods and Agricultural Residues. Appendix Volume (Manuscript Copies).
Semiannual rept.
Apr 80, 117p NSF/RA-800069
Grant NSF-PFR77-08979

This appendix volume contains papers on the following topics: the associative effects among organosolv lignin components; the effect of heating and quenching rates on volatiles produced from combustion-level-heat-flux pyrolysis of biomass; and the effect of particle size on volatiles produced from plasma pyrolysis of lignin. Organosolv lignins isolated under relatively mild conditions from angiosperms are composed of entities having low molecular weights. The extent to which an individual component may participate in association depends appreciably upon the relative proportions of the other species present. A simple conduction model is used to adequately predict the devolatilization rate of lignin pellets. The data reported has application to processes in which densified biomass is a fuel or feedstock and the heat transfer rate appears to limit the reaction rate. Models of biomass pyrolysis presented in the literature are reviewed for effect of particle size on product distribution. Compressed lignin pellets of varying sizes are pyrolyzed in a microwave plasma and char and volatile yields are reported as functions of particle size. Chemical analyses of noncondensible and condensible volatiles are presented and possible formation mechanisms are discussed.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A086 349/8 PC **A04**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Computer Science
On the Optimal Solution of Large Linear Systems.
J. F. Traub, and H. Wozniakowski. Jan 80, 74p
Contract N00014-76-C-0370, Grant NSF-MCS78-23676
Prepared in cooperation with Columbia Univ., NY. Dept. of Computer Science.

We investigate the minimal number of matrix-vector multiplications to approximately solve a linear system. The minimal number of multiplications depends on the properties of a class of problems such as symmetry, positive definiteness, and bound on condition number. For different classes of problems we obtain the minimum exactly or almost exactly and establish with algorithms are optimal, that is, attain the minimum. Furthermore, we obtain quantitative results on how the lack of certain properties increases the minimum. (Author)

AD-A086 364/7 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Convergent Approximations in Parabolic Variational Inequalities. II. Hamilton-Jacobi Inequalities.
Technical summary rept.,
Joseph W. Jerome. Mar 80, 18p Rept no. MRC-TSR-2047
Contract DAAG29-75-C-0024
See also AD-A083 814.

This paper studies the two-sided differential inequality which characterizes the optimal payoff in a two-person differential game, when the strategies available to the players are stopping times. By converting the inequality to an equation via a so-called penalization method, we are able to apply a standard numerical method for approximating solutions of nonlinear equations. We obtain new rates of convergence for the procedure. (Author)

AD-A086 366/2 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
What is the Main Diagonal of a Biinfinite Band Matrix.
Technical summary rept.,
Carl de Boor. Mar 80, 17p Rept no. MRC-TSR-2049

Contract DAAG29-75-C-0024

It is shown how to single out a particular diagonal of a biinfinite band matrix A as its main diagonal, using the decomposition of the solution set of Ax = 0 into those which are bounded at infinity and those which are bounded at -infinity. As an application, it is proved that the inverse of the coefficient matrix for the system satisfied by the B-splines coefficients of the cubic spline interpolant at knots is checkerboard and that, under certain assumptions, the local mesh ratio must be bounded. (Author)

AD-A086 367/0 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On the Number of Periodic Trajectories for a Hamiltonian Flow on a Convex Energy Surface.
Technical summary rept.,
Ivar Ekeland, and Jean-Michel Lasry. Mar 80, 49p Rept no. MRC-TSR-2050
Contract DAAG29-75-C-0024

In this paper, it is assumed that the Hamiltonian H is convex of IR(n) x IR(n), and that the origin (0,0) is an isolated equilibrium. It is also assumed that some ball B around the origin can be found such that the energy surface H to the minus 1(h) lies outside B but inside square root of 2 B. Under these assumptions, we prove that there are at least n distinct periodic orbits of the Hamiltonian flow (H) with energy level h. (Author)

AD-A086 369/6 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Convergence Estimates for Semidiscrete Parabolic Equation Approximations.
Technical summary rept.,
Peter H. Sammon. Mar 80, 49p Rept no. MRC-TSR-2053
Contract DAAG29-75-C-0024, Grant NSF-MCS78-09525

In this paper, we study certain semidiscrete methods for approximating the solutions of initial boundary value problems, with homogeneous boundary conditions, for certain kinds of parabolic equations. These semidiscrete methods are based upon the availability of several different Galerkin-type approximation methods for the associated elliptic steady-state problem. The properties required of the spacial discretization methods are listed and estimates of the error made by the resulting semidiscrete approximations and of its time derivatives are given. In particular, estimates are given that require only weak smoothness assumptions on the initial data. Verifications of the required properties for various Galerkin-type methods are also given. (Author)

AD-A086 371/2 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Notes on Generalized Boundary Value Problems in Banach Spaces. I. Adjoint and Extension Theory.
Technical summary rept.,
R. C. Brown. Mar 80, 40p Rept no. MRC-TSR-2055
Contract DAAG29-75-C-0024

Multipoint boundary conditions arise in the theory of beams or plates with interior point loads, and also the mathematical theory of splines. Interface conditions arise in problems of diffusion through parallel 'slabs' with different properties (e.g., nuclear reactors or the study of shock waves). Adjoints of such differential operators also are encountered when one attempts to derive Euler-Lagrange equations for constrained minimization problems. Our method is very general and is designed to work for partial differential, integral and functional differential operators as well as differential operators. Part I presents some of the abstract machinery to solve the problem. Part II will apply this machinery to concrete and applied problems of the type mentioned above.

AD-A086 372/0 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Cumulative Processes: Linear Combinations of Order Statistics and Percentiles.
Technical summary rept.,
Sue Leurgans. Mar 80, 33p Rept no. MRC-TSR-2056
Contract DAAG29-75-C-0024, Grant NSF-MCS78-09525
Sponsored in part by Grant NSF-MCS77-16974.

Percentiles and linear combinations of order statistics are statistics which are sometimes preferred to averages because they can be less sensitive to the presence of a few wild observations. It is well known that for large samples, both percentiles and linear combinations of order statistics resemble averages in that the appropriately normalized statistic is approximately normally distributed, with parameters which depend on the underlying distributions. This paper shows that percentiles and linear combinations of order statistics resemble averages in a stronger sense. It is well known that if a sequence of averages is plotted against the number of observations contributing to the average, and the resulting plot is rescaled appropriately, then for long sequences the picture will act like a realization of a Brownian motion path. This paper establishes that this is still true if the averages are replaced by percentiles or by linear combinations of order statistics. (Author)

AD-A086 373/8 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Dichotomies for Band Matrices.
Technical summary rept.,
Carl de Boor. Mar 80, 27p Rept no. MRC-TSR-2057
Contract DAAG29-75-C-0024

Spline approximation is often most effective when the breakpoint (knot) sequence can be chosen suitably nonuniform. At the same time, standard spline approximation schemes (such as least-squares approximation by splines) are so far only known to be bounded as long as the breakpoint sequence is almost uniform. Any such bound is obtained (explicitly or implicitly) in terms of a bound on the inverse of certain matrices which are banded. Any attempt at establishing bounds for more general breakpoint sequences must therefore come to grips with the inverses of these band matrices. The hope is that Demko's discovery of the exponential decay of band matrix inverses will lead eventually to those desired bounds. (Author)

AD-A086 380/3 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On the Maximum Principle for Pseudoparabolic Equations.
Technical summary rept.,
Emmanuele Di Benedetto, and Michel Pierre. Apr 80, 56p Rept no. MRC-TSR-2062
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by Grant NSF-MCS78-09525.

This report consider the equation d/dt (mu - lambda delta mu)-delta mu=0 in a cylindrical domain. Unlike the heat equation, the positivity of the boundary data is not sufficient to insure that the solution is nonnegative. It is desirable to identify those boundary data for which the above property is true. One reason is that, since the above equation is a model for heat conduction and for fluid flow in fractured porous media, it is of interest to locate those boundary data that make the correspondent physical process meaningful. In this paper several boundary value problems associated with the above equation are studied and necessary and sufficient conditions on the data are given to insure the nonnegativity of the solution.

AD-A086 381/1 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Stationary Points and Finite-Difference Schemes for Differential Inclusions.
Technical summary rept.,
Jean-Pierre Aubin. Apr 80, 29p Rept no. MRC-TSR-2063
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

So called 'differential inclusions', in which the rate of change x(dot) of the state variable x is restricted to lie in a specified set F(x) (and not given exactly) arise naturally in economics, control theory and other fields. As with differential equations, one is interested in the existence of stationary points. Here it is shown that if F is tangent to a compact convex set (in a sense made precise), then the differential inclusion has a stationary point within this set. Moreover, a discrete implicit difference scheme which approximates the inclusion will also be solvable when the tangency condition holds and the initial data is chosen from the set.

AD-A086 382/9 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Viable and Monotone Trajectories of Differential Inclusions.
Technical summary rept.,
Jean-Pierre Aubin. Apr 80, 32p Rept no. MRC-TSR-2064
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

This paper begins with an exposition of results of Haddad on the solvability of differential inclusion (in which the rate of change x(dot) of the state variable x is restricted to lie in a specified at F(x) and is not given exactly) for a solution x with x(t) epsilon K for t greater than or = 0 and K a specified set of 'viable states'. Problems of this sort arise naturally in control theory and economics. A main point is the generality of the assumptions under which the theory is successful. Results on monotone trajectories and the convergence of a generalized Newton method to a rest state are also presented. (Author)

AD-A086 383/7 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Fully Nonlinear Second Order Elliptic Equations with Large Zeroth Order Coefficient.
Technical summary rept.,
Lawrence C. Evans, and Pierre-Louis Lions. Apr 80, 22p Rept no. MRC-TSR-2065
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by Grant NSF-MCS77-01952.

This report proves the existence of classical solutions to certain fully non-linear second order elliptic equations with large zeroth order coefficient. The principal tool is an a priori estimate asserting that the C superscript 2, alpha-norm of the solution cannot lie in a certain interval of the positive real axis. (Author)

AD-A086 384/5 PC **A05**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Connection of Close Quarters to Generalized Turning Points.
Technical summary rept.,
J. F. Painter, and R. E. Meyer. May 80, 98p Rept no. MRC-TSR-2068
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041
Sponsored in part by Grant NSF-MCS77-00097.

The solutions of Schroedinger equations have well-known WKB-approximations, but the coefficients in these differ on the two sides of a turning point. A new method for connecting them across such points is developed to extend present theory to a more general class of turning points, which includes logarithmic branch points of q(z), among many others. To this end, a delicate contraction for an integral equation differing from those of Langer and Olver is used to show that Bessel functions can still approximate the solutions at a certain, small distance from the irregular point of above Schroedinger equation even though not uniformly near it. A novel feature of the analysis is that the extreme variation of the exponential kernel is here controlled even on non-progressive paths. Connection is completed radially by means of the same integral equation.

AD-A086 416/5 PC **A02**/MF **A01**
California Univ Santa Barbara Inst for Algebra and Combinatorics
On Certain Finite Dimensional Numerical Ranges and Numerical Radii.
Moshe Goldberg. 17 Jun 78, 16p AFOSR-TR-80-0436
Contract F49620-78-C-0030

Pub. in Linear and Multilinear Algebra, v7 p329-342 1979.

No abstract available.

AD-A086 449/6 PC **A02**/MF **A01**
Desmatics Inc State College PA
Factor Screening in Computer Simulation: Considerations in Performance Evaluation.
Technical rept.,
Dennis E. Smith, and Carl A. Mauro. Jul 80, 24p
Rept no. TR-113-2
Contract N00014-79-C-0650

Although computer simulation is a major area in which factor screening situations are frequently encountered, adequate methodology has not been developed to resolve the factor screening problem. Within the constraint of a limited number of computer runs, a decision must be made about the selection of a screening strategy that will perform efficiently and effectively. This report reviews the major classes of screening designs that have been suggested and recommends two strategies for further research. In addition, a fundamental screening model is defined, and a performance measure for evaluating screening strategies is developed. (Author)

AD-A086 465/2 PC **A07**/MF **A01**
Kentucky Univ Lexington Dept of Mathematics
Structures and Algorithms in Stochastic Realization Theory and the Smoothing Problem.
Interim technical rept.,
Faris Abdul-Jabbar Badawi. Jan 80, 149p
AFOSR-TR-80-0458
Grant AFOSR-78-3519
Doctoral thesis.

This report contains two main topics, each of which is connected to the stochastic realization problem. First, it considers some structural and algorithmic problems in wide sense stochastic realization theory which also have applicability to many problems outside the realm of stochastic realization theory but are here formulated in that framework. It considers some geometric questions concerning the solution set of the positive real lemma and provide a Hamiltonian framework for the non-Riccati algorithms of Kailath and Lindquist; these are then applied to the stochastic realization problem. Secondly, it applies the basic techniques and concepts of the strict sense (proper) stochastic realization theory of Lindquist and Picci and Ruckebusch to the discrete-time smoothing problem. This provides a natural interpretation of the Mayne-Fraser two-point formula as well as many other smoothing results, the interpretations of which have hitherto been quite unclear from a probabilistic point of view. Hence we have laid the ground work for a theory of smoothing which has so far been lacking.

AD-A086 475/1 Not available NTIS
Defence Research Establishment Pacific Victoria (British Columbia)
Algorithms for Least-Squares Linear Prediction and Maximum Entropy Spectral Analysis. Part I. theory,
I. Barrodale, and R. E. Erickson. 3 Oct 78, 14p
Rept no. DREP-REPRINT-80-1
See also Part 2, AD-A086 476.
Availability: Pub. in Geophysics, v45 n3 p420-432 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 476/9 Not available NTIS
Defence Research Establishment Pacific Victoria (British Columbia)
Algorithms for Least-Squares Linear Prediction and Maximum Entropy Spectral Analysis. Part II. Fortran Program,
I. Barrodale, and R. E. Erickson. 3 Oct 78, 15p
Rept no. DREP-REPRINT-80-2
See also Part 1, AD-A086 475.
Availability: Pub. in Geophysics, v45 n3 p433-446 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 492/6 PC **A04**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
On-Line Tuning of Multivariable PI Controllers Using Principal Component Analysis: Preliminary Results,
B. C. Moore. Apr 79, 54p Rept no. LIDS-R-7905
Contract N00014-79-C-0377
Prepared in cooperation with Toronto Univ. (Ontario). Dept. of Electrical Engineering. See also AD-A082 362.

There has been considerable interest lately in the application of singular value analysis in systems theory. The basic ideas, however, were developed in statistics (Hotelling introduced principal component analysis in 1933) and are currently used in numerical analysis and digital filtering. The fundamental results underlying principal component analysis are presented in this paper, and these results are applied to the problem of tuning multivariable proportional plus integral controllers. Although the tuning method proposed is preliminary, it is designed to avoid possible traps which would prevent 'tight' tuning with conventional tuning of individual loops. When applied to non-interacting loops, the method reduces to conventional tuning of the loops simultaneously. (Author)

AD-A086 518/8 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
TI-59 Programs for Multiple Regression.
Technical rept.,
Donald R. Barr. May 80, 26p Rept no. NPS55-80-018

Programs for conducting multiple regression analyses with up to seven independent variables are given for the TI-59 calculator. (Author)

AD-A086 521/2 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
Classification Techniques for Multivariate Data Analysis.
Master's thesis,
Jin Ki Lee. 28 Mar 80, 121p

The multivariate analysis techniques of cluster analysis, principal components analysis, and discriminant analysis are examined in this thesis. The theory and applications of each of the techniques are discussed. Computer software available at the Naval Postgraduate School is discussed and sample jobs are included. A hierarchical cluster analysis algorithm, available in the IMSL software package, is applied to a set of data extracted from a group of subjects for the purpose of partitioning a collection of 26 attributes of a weapon system into six clusters of superattributes. A nonhierarchical clustering procedure, principal components analysis, and discriminant analysis were all applied to a collection of data on tanks consisting of twenty-four observations of ten attributes of tanks. The cluster analysis shows that the tanks cluster somewhat naturally by nationality. The principal components analysis and the discriminant analysis show that tank weight is the single most important discriminator among nationality. (Author)

AD-A086 556/8 PC **A02**/MF **A01**
Maryland Univ Baltimore Dept of Mathematics
Estimation Problems with Lie Group Structure,
James Ting-Ho Lo. 1977, 7p AFOSR-TR-80-0486
Grant AFOSR-74-2671
Pub. in Proceedings of the IEEE Conference on Decision and Control, p634-638 1977.

No abstract available.

AD-A086 561/8 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Regularizing Effects of Homogeneous Evolution Equations.
Technical summary rept.,
Michael G. Crandall, and Philippe Benilan. May 80, 23p Rept no. MRC-TSR-2076
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

It is well-known that solving the initial-value problem for the heat equation forward in time takes a 'rough' initial temperature into a temperature which is smooth at later times t > greater than 0. One aspect of this is the validity of certain estimates on tut when u is a solution of the heat equation. In this paper we prove related estimates on nonlinear evolution equations which are governed by homogeneous nonlinearities. The results apply to classes of nonlinear diffusion equations and to conservation laws. The results are interesting from the point of view of identifying a new 'regularization' mechanism and the estimates themselves cast new light on the nature of the solutions of some initial-value problems with rough initial data. (Author)

AD-A086 562/6 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Measures of Lack of Fit, and Transformation of Predictors in Composite Designs.
Technical summary rept.,
G. E. P. Box, and N. R. Draper. May 80, 24p
Rept nos. MRC-TSR-2077, UWIS-DS-80-603
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

The central composite designs are investigated in terms of their ability to detect lack of fit and it is shown that measures of non-quadraticity can be obtained in all the k major directions. The geometrical interpretation of this is explained. The relationship of these lack of fit measures to the estimation of power transformations in the predictor variables is also explored. (Author)

AD-A086 563/4 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
A Study of the Properties of a New Goodness-of-Fit Test.
Technical rept. Jan-Mar 80,
Richard Franke, and Toke Jayachandran. 1 May 80, 93p Rept no. NPS-53-80-003

We investigate the power properties of a new goodness-of-fit test proposed by Foutz (1980). This new test is compared with the Chi squared test and the Kolmogorov-Smirnov (K-S) test for normality when the samples come from (1) the family of asymmetric stable distributions, (2) mixture of normal distributions, and (3) the Pearson family. The general conclusion is that the new test performs better than the Chi squared and the K-S test when the parent distribution is heavy tailed. If the hypothesized distribution differs from the true distribution in location only, the new test does not do as well as the other two. (Author)

AD-A086 578/2 PC **A05**/MF **A01**
California Univ Berkeley
Foundations of Feedback Theory for Nonlinear Dynamical Systems,
C. A. Desoer, and Y. T. Wang. 31 Aug 79, 83p
Contract F44620-76-C-0100, Grant NSF-ENG76-84522

We study the fundamental properties of feedback for nonlinear, time-varying, multi-input, multi-output, distributed systems. The classical Black formula is generalized to the nonlinear case. Achievable advantages and limitations of feedback in nonlinear dynamical systems are classified and studied in five categories: desensitization, disturbance attenuation, linearizing effect, asymptotic tracking and disturbance attenuation, linearizing effect, asymptotic tracking and disturbance rejection, stabilization. Conditions under which feedback is beneficial for nonlinear dynamical systems are derived. Our results show that if the appropriate linearized inverse return difference operator is small, then the nonlinear feedback system has advantages over the open-loop system. Several examples are provided to illustrate the results.

AD-A086 580/8 PC **A02**/MF **A01**
University of Southern California Los Angeles Dept of Electrical Engineering
Tight Rounds on the Response of Multivariable Systems with Component Uncertainty,
Michael G. Safonov. 31 Aug 79, 10p
Contract F44620-76-C-0061, Grant NSF-ENG78-05628

For Multi-Input-Multi-Output (MIMO) feedback systems having internal components that are subject to parameter variations, nonlinearity, or unmodeled dynamics within given 'conic sector' bounds, tight bounds (which also turn out to take the form of 'conic sector' bounds) are derived for the input-output relation of the closed-loop system. Inthe case of linear-time invariant systems, the 'conic

sector' bounds are interpretable in terms of the maximal singular values of certain frequency-response matrices. (Author)

AD-A086 581/6 PC **A03**/MF **A01**
Honeywell Systems and Research Center Minneapolis MN
Robustness of Multiloop Linear Feedback System,
J. C. Doyle. 31 Aug 79, 27p
Contract N00014-75-C-0144

This paper presents a new approach to the analysis of robustness or sensitivity of multiloop linear feedback systems. The properties of the return difference equation are examined using the concepts of singular values, singular vectors and the spectral norm of a matrix. A number of new tools for multiloop systems are developed which are analogous to those for scalar Nyquist and Bode analysis, providing a generalization of the scalar frequency-domain notions such as stability margins and M-circles. (Author)

AD-A086 582/4 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Robust Stability of Linear Dynamic Systems with Application to Singular Perturbation Theory,
Nils R. Sandell, Jr. 4 Aug 78, 25p Rept no. LIDS-P-837
Contracts N00014-76-C-0346, E(49-18)-2987

A simple approach is given to determine conditions for stability of linear feedback systems subject to additive and multiplicative perturbations in the operators describing these systems. The approach is based on techniques used in functional analysis, and provides an alternative development and generalization of some conditions for the time-invariant case that have appeared in the literature very recently. As an example of the application of the conditions, we consider the determination of finite regions of stability for singularly perturbed systems. (Author)

AD-A086 585/7 PC **A05**/MF **A01**
Tel-Aviv Univ (Israel) Dept of Mathematical Sciences
Scheme Independent Stability Criteria for Difference Approximations to Hyperbolic Initial Boundary Value Systems.
Technical rept.,
Eitan Tadmor. Feb 79, 93p AFOSR-TR-80-0470
Grant AFOSR-78-3651

We consider finite difference approximations to the mixed initial boundary value problems of the hyperbolic system $v(t) = au(x)$ in the quarter plan $x > 0, t > 0$. The finite difference approximations may be either dissipative or non-dissipative. Easily checkable sufficient stability criteria are obtained entirely in terms of the boundary conditions for the out flow variables. It is shown how to extend the results for the two dimensional case when the boundary conditions in the y direction allow Fourier transformations. Examples are given. (Author)

AD-A086 607/9 PC **A02**/MF **A01**
University of Southern California Los Angeles Dept of Electrical Engineering
A Multiloop Generalization of the Circle Stability Criterion,
Michael G. Safonov, and Michael Athans. 1978, 8p
Contract F44620-76-C-0061, Grant NGL-22-009-124
Presented at the Annual Asilomar Conference (12th) on Circuits, Systems, and Computers, Pacific Grove, CA, 6-8 Nov 78. Sponsored in part by Grants NSG-1312 and NSF-ENG78-05628.

A frequency-domain stability criterion is presented, generalizing the well-known circle stability criterion to multiloop feedback systems having bounded nonlinearity, parameter variations, and/or frequency-dependent ignorance of component dynamics. Unlike previous generalizations, the theory is not restricted to weakly-coupled, diagonally dominant or nearly normal systems. Potential applications include the analysis of feedback system integrity and multiloop feedback system stability margins. (Author)

AD-A086 608/7 PC **A02**/MF **A01**
Lund Inst of Tech (Sweden) Dept of Automatic Control
Robustness Results for State Feedback Regulators,
Per Molander, and J. C. Willems. 31 Aug 79, 10p

State feedback regulators are derived which have better robustness characteristics than the standard 60 deg phase margin and 50% gain reduction tolerance of standard linear- quadratic regulators. It is also shown how the Lyapunov equation can be used to design high-integrity regulators for open-loop stable systems. (Author)

AD-A086 609/5 PC **A02**/MF **A01**
Honeywell Systems and Research Center Minneapolis MN
On Feedback Systems Possessing Integrity with Respect to Actuator Outages,
C. A. Harvey. 31 Aug 79, 11p
Contract DOE-ET-78-C-01-3391

For systems that are open-loop stable, there is a class of feedback controllers that have the property that the closed loop system is stable and remains stable in case actuator outages occur. Properties of a special subclass of these controllers are discussed. (Author)

AD-A086 610/3 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Electrical Engineering and Computer Science
Robustness with Observers,
J. C. Doyle, and G. Stein. 31 Aug 79, 20p
Contract N00014-79-C-0377

This paper describes an adjustment procedure for observer-based linear control systems which asymptotically achieve the same loop transfer functions (and hence the same relative stability, robustness, and disturbance rejection properties) as full-state feedback control implementations. (Author)

AD-A086 611/1 PC **A02**/MF **A01**
Cambridge Univ (England) Dept of Engineering
Methods for Assessing the Robustness Properties of a Linear Multivariable Feedback Design.
Lecture notes,
Ian Postlethwaite. 31 Aug 79, 22p

On completing the design of a multivariable feedback system it is always desirable to be able to predict that under certain changes the system will remain stable. In these notes some methods are described for determining the robustness properties of a multivariable feedback system under (1) simultaneous variation of sensor (or actuator) gains; (2) simultaneous nonlinear perturbations of loop gains; and (3) plant parameter uncertainty. (Author)

AD-A086 612/9 PC **A02**/MF **A01**
Cambridge Univ (England) Dept of Engineering
A Note on Parametric Stability,
I. Postlethwaite. 1978, 14p

This note shows how recent developments in the complex variable analysis of multivariable feedback systems can be used to determine stability with respect to a system parameter. (Author)

AD-A086 617/8 PC **A02**/MF **A01**
Maryland Univ Baltimore Dept of Mathematics
Exponential Fourier Densities on SO (3) and Optimal Estimation and Detection for Rotational Processes,
James Ting-Ho Lo, and Linda R. Eshleman. 9 Sep 76, 12p AFOSR-TR-80-0487
Grant AFOSR-74-2671
Pub. in SIAM Jnl. of Applied Mathematics, v36 n1 p73-82 Feb 79.

No abstract available.

AD-A086 618/6 PC **A02**/MF **A01**
Maryland Univ Baltimore Dept of Mathematics
Optimal Filters for Bilinear Systems with Nilpotent Lie Algebras,
Shirish D. Chikte, and James Ting-Ho Lo. 8 Nov 78, 8p AFOSR-TR-80-0488
Grant AFOSR-74-2671
Pub. in IEEE Transactions on Automatic Control, vAC-24 n6 p948-953 Dec 79.

No abstract available.

AD-A086 641/8 MF **A01**
Naval Postgraduate School Monterey CA
An Investigation of Cluster Analysis Techniques as a Means of Structuring Specifications in the Design of Complex Systems.
Master's thesis,
Timothy A. Holden. Jun 78, 314p
Availability: Microfiche copies only.

The purpose of this thesis is to investigate the use of a specific cluster analysis technique developed by Dr. Raphael Andreu. As a means of imposing a framework upon the requirements for an existing computer operating system forming the first step in the decomposition of the global design problem into subproblems. It is envisioned that the imposition of such a framework on design requirements will provide new insights and understanding of the relationships among requirements which may verify the design or suggest improvements to the design of a sample operating system.

AD-A086 661/6 PC **A03**/MF **A01**
Michigan Univ Ann Arbor Dept of Mathematics
Approximation of the Spectrum of Closed Operators, the Determination of Normal Modes of a Rotating Basin.
Interim rept.,
Mitchell Luskin, Jean Descioux, and Jacques Rappaz. Mar 80, 44p AFOSR-TR-80-0548
Contract F49620-79-C-0149

This paper gives a theory of spectral approximation for closed operators in Banach spaces. The perturbation theory developed in this paper is applied to the study of a finite element procedure for approximating the spectral properties of a differential system modeling a fluid in a rotating basin. (Author)

AD-A086 685/5 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Stability of Diced Systems.
Interim rept.,
T. L. Johnson. Mar 80, 21p LIDS-P-980, AFOSR-TR-80-0547
Contracts F49620-80-C-0002, DOE-ET-76-C-0102295

Diced systems are defined as autonomous systems governed by ordinary differential equations having discontinuities (in R to the nth power) on submainfolds where one or more of the state variables takes an integer value. Such systems may be regarded as approximations of continuous systems or as representative models of a class of discontinuous systems. Trajectories of such systems (for a given initial state) are readily calculated and may exhibit complex sliding-mode segments. Asymptotic properties of such trajectories are discussed and classified. Motivation is given in terms of observed properties of interconnected power systems. (Author)

AD-A086 701/0 PC **A04**/MF **A01**
Basel Univ (Switzerland) Mathematics Inst
On a Generalization of the Newton-Sylvester Inequalities.
Basel mathematical notes,
A. M. Ostrowski. Apr 79, 54p Rept no. BMN-52
Grant DA-ERO-75-G-035

Contents: Introductory lemmas (Lemmas 1, 2); Identically vanishing F sub nu (Lemmas 3, 4); Vanishing of the F sub nu at a point (Lemmas 5, 6); Behavior of the F sub nu at infinity (Lemma 7); The f gaps (Lemmas 8 - 12); The F gaps (Lemma 13); Main Theorem (Main Theorem, 1., 2., 3. Complement to the M.T.); Newton's Rule; Bibliography. (Author)

AD-A086 712/7 PC **A02**/MF **A01**
Delaware Univ Newark Applied Mathematics Inst
Analytic Continuation of Solutions to Linear Partial Differential Equations.
Interim rept.,
David Colton. 1980, 20p TR-76A, AFOSR-TR-80-0498
Grants AFOSR-76-2879, NSF-MCS78-02542

In this paper we shall indicate some of the current directions in the study of the analytic continuation

of solutions to partial differential equations. Our intended audience is not only those mathematicians working in the area of partial differential equations, but also complex analysts interested in seeing how a major topic in the theory of analytic functions can be extended to include certain classes of linear partial differential equations. Our specific aim is to provide a survey of the general area of the analytic continuation of solutions to partial differential equations and their applications.

AD-A086 771/3 PC **A03**/MF **A01**
California Univ Berkeley Operations Research Center
Preposterior Analysis of Bayes Estimators of Mean Life. I.
Research rept.,
Richard E. Barlow, and Alexander S. Wu. Feb 80, 26p Rept no. ORC-80-4
Contract N00014-75-C-0781

In considering life test experiments from a behavioristic Bayes point of view, we may speculate on the effect of model misspecification on the posterior mean under alternative stopping rules. Of course, under the life distribution model, we expect the mean of the posterior to equal the mean of the prior. However, if we think the model may have been misspecified, we would no longer expect this equality. We show that for Bayes estimators of mean life under the exponential model and general priors on mean life, we expect, based on a preposterior analysis, that the mean of the posterior will increase with sample size when the true model has an increasing failure rate and certain fixed stopping rules are used. Also, we show that for Bayes estimators of mean life based on the natural conjugate prior for the exponential model and complete samples, the Bayes risk is less when the coefficient of variations is less than for the exponential model. Recommendations relative to use of life test sampling plans based on an exponential model are made. (Author)

AD-A086 807/5 PC **A02**/MF **A01**
Stanford Univ CA Div of Applied Mechanics
On Matched Asymptotic Expansions and the Calculus of Variations.
Interim rept.,
H. Pasic, and G. Herrmann. Jun 80, 19p Rept no. SUDAM-80-3
Contract N00014-76-C-0054

It is shown, with the aid of two examples, that the calculus of variations may be used to an advantage over the method of matched asymptotic expansions in solving singular boundary-layer problems of applied mechanics. (Author)

AD-A086 826/5 PC **A04**/MF **A01**
Naval Ocean Systems Center San Diego CA
Two's-Complement Fixed-Point Multiplication Errors - Theory.
Final rept. May 75-Sep 79,
L. P. Mulcahy. 1 Apr 80, 59p Rept no. NOSC/TR-538

Analytic forms of a variety of two's-complement multiplication error statistics are derived. An FIR filter structure is used to define the individual error statistics which are used in the calculation of the filter output variance and spectrum. The approach used in deriving the statistics is to show that a regularity exists in the structure of the errors as the multiplier input is stepped through a series of consecutive values. The error structure is a function of co-efficient value, number representation, and word lengths. This regular structure allows the use of the Poisson Summation Formula in deriving error statistics based on multiplier inputs obtained from quantized random variables. The error statistics are categorized according to families of coefficient values denoted by the parameter v. This parameter is the effective word length of the error. Specific forms of the statistics are given for Gaussian quantizer inputs. (Author)

AD-A086 828/1 PC **A02**/MF **A01**
Temple Univ Philadelphia PA Dept of Mathematics
Failure Time Distributions: Estimates and Asymptotic Results.
Interim rept.,
Janos Galambos. 1980, 24p AFOSR-TR-80-0515
Grant AFOSR-78-3504

The paper deals with life distributions for coherent systems of components. Two major questions are discussed: (1) estimation of system life from data, or knowledge, on component lives, and (2) asymptotic models. Both questions are related to extremes of a sequence of random variables through the path set and cut set decompcsition of coherent systems, which reduce a coherent system to either a parallel or series system. Since for these decompositions, the classical theory of extremes of independent and identically distributed random variables does not provide an acceptable approximation, the emphasis is on dependent random variables, or when the random variables are not identically distributed. The inequalities presented when discussing question (i) above are applicable not only to extreme value problems but to an arbitrary multivariate distribution using lower dimensional marginals. The asymptotic models are discussed in the light of hazard rate properties of the limiting distributions of the models. A parametric family of distributions is proposed for approximating life distributions whose hazard rate is bath-tub shaped, this representing a burn-in period, an accidental failure period and a wear-out period. (Author)

AD-A086 830/7 PC **A03**/MF **A01**
Illinois Univ At Chicago Circle Dept of Mathematics
Study of Optimality Criteria in Design of Experiments.
Interim rept.,
A. Hedayat. 3 Jun 80, 33p AFOSR-TR-80-0514
Grant AFOSR-79-3050
Presented at the International Symposium on Statistics and Related Topics, 5-8 May 80, Ottawa (Canada).

This paper have rigorously studied various optimality criteria currently adopted by design specialists in choosing a best design for performing an experiment. These optimality criteria includes: G-optimality, D-optimality, L-optimality, E-optimality, S-optimality, (M,S)-optimality, PHI sub p-criteria, Universal optimality, type 1 and 2 criteria and Schur optimality. (Author)

AD-A086 845/5 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Statistics
Imperfect Repair.
Interim rept.,
Mark Brown, and Frank Proschan. Apr 80, 15p
FSU-STATISTICS-M546, TR-78-108-AFOSR, AFOSR-TR-80-0533
Contract F49620-79-C-0157, Grant AFOSR-78-3678

A device is repaired at failure. With probability p, it is returned to the 'good as new' state (perfect repair); with probability 1 - p it is returned to the functioning state, not is only as good as a device of age equal to its age at failure (imperfect repair). Repair takes negligible time. We obtain the distribution F sub p of the interval between successive good as new states in terms of the underlying life distribution F. We show that if F is in any of the life distribution classes: IFR, DFR, IFRA, DFRA, NBU, NWU, DMRL, or IMRL, then F sub p is in the same class. Finally, a number of monotonicity properties for various parameters and random variables of the stochastic process is obtained. The results obtained are of interest in the context of stochastic processes in general, as well as being useful in the particular imperfect repair model studied.

IFVE-OTF-78-86 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Some Basis in Semisimple Lie Algebras.
A. N. Leznov, and M. V. Saveliev. 1978, 10p
U.S. Sales Only.

An explicit construction of the basis and commutation relations for the arbitrary semisimple Lie algebra g generators is given on the basis of the universal embedding of SU(2) in g. Generators of g are labelled by the quantum numbers l and m of the angular momentum basis vectors, whose spectrum is fixed for each g and coincides with its indices. The basis has clearness of the tensor structure as well as universality of the root technique, which enable one to use it for all semisimple Lie algebras. (Atomindex citation 10:427700)

JINR-E-5-10756 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Simple Properties of Some Ideals of Compact Operators in Algebras of Unbounded Operators.
W. Timmermann. 1977, 14p
U.S. Sales Only.

Several ideals of compact and completely continuous operators in algebras of unbounded operators are defined. Simple properties such as the density of the finite-dimensional operators are discussed. The connection with the approximation problem is indicated. (Atomindex citation 09:399434)

JINR-E-5-10757 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Ideal in Algebras of Unbounded Operators.
W. Timmermann. 1977, 14p
U.S. Sales Only.

The closure of the set of finite dimensional operators with respect to different topologies is considered. The obtained ideals have many properties similar to those of the ideal of completely continuous operators on the Hilbert space. For example, on some appropriate assumptions all continuous functionals are normal, irreducible representations are equivalent to the identical representation and so on. (Atomindex citation 09:409076)

PB80-198187 Not available NTIS
National Bureau of Standards, Washington, DC.
An Unrestricted Algorithm for the Exponential Function.
Final rept.,
C. W. Clenshaw, and F. W. J. Olver. Apr 80, 22p
Pub. in SIAM Jnl. on Numerical Analysis 17, n2 p310-331 Apr 80.

An algorithm is presented for the computation of the exponential function of real argument. There are no restrictions on the range of the argument or on the precision that may be demanded in the results.

PB80-202203 PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Small Sample Properties of Various Tests on 2 x 2 Tables.
Victor Hasselblad, and Andrew G. Stead. May 80, 23p EPA-600/9-80-029

With particular interest in the likelihood ratio tests and tests generated by the categorical analysis methods of Grizzle, Starmer, and Koch, the small sample behavior of actual alpha levels is graphically illustrated for several asymptotically chi-square statistics when testing is performed on 2 x 2 contingency table data at a nominal level of .05. This behavior is examined for hypotheses testing both homogeneity and independence. In the homogeneity case, the effects on these levels are examined for equal or unequal sample sizes. In the independence case, the effects of different constraints concerning individual cell probabilities are demonstrated. Visual comparisons of the power of the likelihood ratio and the Grizzle, Starmer, Koch related statistics are also provided.

PB80-203409 Not available NTIS
National Bureau of Standards, Washington, DC.
Asymptotic Approximations and Error Bounds.
Final rept.,
F. W. J. Olver. 1980, 16p
Pub. in SIAM Review 22, n2 p188-203 Apr 80.

The purpose of this paper is to demonstrate that well-constructed error bounds for asymptotic approximations can provide useful analytical insight into the nature and reliability of the approximations, enable somewhat unsatisfactory concepts such as multiple asymptotic expansions and generalized asymptotic expansions to be avoided, and lead to significant extensions of asymptotic results.

PB80-204829 PC **A04**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Time Series Analysis Programs.
Technical rept.,
Alan D. Chave. May 80, 58p WHOI-80-23

Grants NSF-OCE77-82255, NSF-OCE79-19258

The report documents a set of Fortran subroutines for manipulating one dimensional, complex-valued time series information. The programs are divided into two libraries: TSLIB for ordinary Fourier analysis and ACLIB for more specialized applications. The latter includes interpolation routines, maximum entropy spectral analysis programs, and subroutines for advanced mathematical operations. The programs are designed for efficiency and speed with a minimum of hidden operations and memory accesses. These subroutines have been used extensively in the analysis of magnetotelluric and other geophysical data.

SAND-78-0367C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Solving ODEs with Discrete Data in SPEAKEASY.
L. F. Shampine. 1978, 16p CONF-780586-2
Contract EY-76-C-04-0789
Symposium on recent advances in numerical analysis, Madison, WI, USA, 22 May 1978.

SPEAKEASY is a very-high-level language designed to make using computers easy for model building. This paper describes the results of an attempt to provide a capability for solving differential equations (DEs) in the language. The language is representative of situations in which one wants to regard the solution of a DEs as a high-level operation requiring no user intervention. It is necessary to confront the question of solving DEs when it is not possible to evaluate the equation anywhere desired because the DEs are defined only at certain points. The problem to be examined is explained, and an algorithm for its solution is sketched. The development of the algorithm is presented under the headings choice of a basic method, necessary conditions on the step size, varying the order, and error measurement. Three examples are given to clarify the method. (ERA citation 05:003944)

SAND-79-0648 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Integration of Equally Spaced Sampled Data Using a Generalized Reconstruction Formula.
D. O. Smallwood. Sep 79, 27p
Contract EY-76-C-04-0789

A family of integration formulas for equally spaced sampled data are derived which can have errors of -70 dB or less over a bandwidth of 95% or more of the Nyquist bandwidth. The formulas are based on the integration of a reconstructed wave-form by use of a generalized Whittaker's cardinal function. 21 figures, 2 tables. (ERA citation 05:002364)

SAND-79-1229C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Statistical Distributions by Special Functions.
D. E. Amos. 1979, 12p CONF-790825-5
Contract EY-76-C-04-0789
Annual meeting of the American Statistical Association, Washington, DC, USA, 12 Aug 1979.

Computational methods developed for functions of mathematical physics have made the construction of robust computer codes possible for many of the special functions related to statistics. Details of Chebyshev approximation, recursion on three-term recursion relations, and quadrature are considered. 2 tables. (ERA citation 05:003947)

UCID-18083 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Note on Normalization of Variables and Equations.
A. A. Mirin. Mar 79, 8p
Contract W-7405-ENG-48

It is pointed out that, even in 1979, with 64-bit computer words and exponent ranges of several hundred, care must be exercised to avoid excessive roundoff error when solving coupled systems of partial differential equations. The remedy is proper normalization of variables. An illustration of the procedure is given. (ERA citation 05:003948)

UCRL-83549 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
M-Dimensional Linear Systems: Determination of Impulse Response Support, Computing Cepstra, and Recursibility Issues.
D. M. Goodman. 2 Nov 79, 7p CONF-791125-2
Contract W-7405-ENG-48
13. Asilomar conference on circuits, systems, and computers, Pacific Grove, CA, USA, 5 Nov 1979.

Conditions for the cepstrum of a bounded-support M-D sequence to exist and be l exp 1 (absolutely summable) are developed, and the support of the cepstrum is related to the support of the l exp 1 inverse of this sequence. The case in which the cepstrum can be computed recursively is discussed, and a general stability theorem for all-pole recursible difference equations is developed. (ERA citation 05:006404)

12B. Operations Research

AD-A086 365/4 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Generalized Equations and Their Solutions. Part II. Applications to Nonlinear Programming.
Technical summary rept.,
Stephen M. Robinson. Mar 80, 31p Rept no. MRC-TSR-2048
Contract DAAG29-75-C-0024, Grant NSF-MCS79-01066
See also Part 1, AD-A049 495.

We prove that if the second-order sufficient condition and constraint regularity hold at a local minimizer of a nonlinear programming problem, then for sufficiently smooth perturbations of the constraints and objective function the set of local stationary points is nonempty and continuous; further, if certain polyhedrality assumptions hold (as is usually the case in applications) then the local minimizers, the stationary points and the multipliers all obey a type of Lipschitz condition. Through the use of generalized equations, these results are obtained with a minimum of notational complexity. (Author)

AD-A086 515/4 PC **A02**/MF **A01**
Naval Postgraduate School Monterey CA
Expanding Area Search: Experiments.
Technical rept.,
Alan R. Washburn. May 80, 19p Rept no. NPS55-80-017

The formula 1 - exp (-(VW/pi U squared) (1/tau - 1/t)) is often used to approximate the probability of detecting a target with speed U by time t if the search does not start until time tau and the searcher's speed and sweep width are V and W, respectively. This report shows some experimental evidence that the formula is an imperfect but reasonably good approximation to what actually happens when the target is evasive. (Author)

AD-A086 560/0 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
A Decomposition Procedure for Large Scale Optimal Plastic Design Problems.
Technical summary rept.,
Ikuyo Kaneko, and Cu Duong Ha. May 80, 30p Rept no. MRC-TSR-2075
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

A decomposition procedure is proposed in this paper for solving a class of large scale optimal design problems for perfectly plastic structures under several alternative loading conditions. The conventional finite element method is used to cast the problem into a finite dimensional constrained nonlinear programming problem. Structures of practically meaningful size and complexity tend to give rise to a large number of variables and constraints in the corresponding mathematical model. The difficulty is that the state-of-the-art Mathematical Programming theory does not provide reliable and efficient ways of solving large scale constrained nonlinear programming problems. The natural idea to deal with the large scale structural problem is to somehow decompose the problem into an assembly of small size problems each of which represents an analysis of the behavior of each finite element under a single loading condition. This paper proposes one such way of decomposition based on the duality theory and a recently developed iterative algorithm. (Author)

AD-A086 744/0 PC **A05**/MF **A01**
Army Military Personnel Center Alexandria VA
Multiple Objectives and the Path Determination Problem.
Final rept.,
Joseph E. Thomas, Jr. 3 Jul 80, 90p
Master's thesis.

The shortests path problem exists as a major component of many network problems. For problems with a single objective, algorithms developed over the past twenty-five years have made the solution of this problem a relatively simple exercise. For multiobjective problems, adaptation of shortest path methodologies to generate noninferior solutions is a complex and difficult task. This thesis introduces an algorithm, based on label-correcting algorithmic techniques, which identifies all noninferior paths from one node in a network to all other nodes in the network in a single computer run. The algorithm, titled the Noninferior Path Labeling Algorithm (NPLA), is shown to be at least four to ten times faster than shortest path labeling algorithms applied multiobjectively for a problem with two objectives. NPLA is judged to be unique in its capability to identify all solutions which lie in duality gaps of the noninferior solution set. NPLA has been found to be easily programmed, efficient, and capable of being used with all network designs. It is readily adaptable to problems of more than two objectives. (Author)

PB80-198195 Not available NTIS
National Bureau of Standards, Washington, DC.
An Elementary Inequality.
Final rept.,
S. Haber. 1979, 5p
Pub. in International Jnl. Math. and Math. Sci. 2, n3 p531-535 1979.

A number of closely related inequalities are presented and proven. A typical related inequality is ((1+a) to the power b) = or > 1 + ab ((1+a(2) to the power (b-1)) for a, b = or > 0 - with the inequality reversed when 1 = or < 2.

SAND-78-2322 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Revised Simplex Code for LP Problems Using Orthogonal Decomposition: A User's Guide.
R. J. Hanson, and J. A. Wisniewski. Aug 79, 48p
Contract EY-76-C-04-0789

The mathematical and algorithmic details that are necessary for reliable, general-purpose linear programming software are documented. FORTRAN subprograms LPMGB( ) and LPMG( ) are described. These subprograms accept a linear minimization problem subject to linear equality constraints with lower and upper bounds on selected variables. The subprogram LPMGB( ) performs preliminary transformations on the given problem. These include the elimination of free variables and normalization of the bounds to be just nonnegativity and upper bounds on selected variables. There remains a core linear programming problem that is solved with subprogram LPMG( ). Further topics discussed in this report are scaling, finding a good initial basis, finding an initial feasible solution, and ejecting the one artificial vector used in this first phase. The technique (previously published) of solving the systems of linear algebraic equations is based on updating an orthogonal decomposition of the matrix of basis vectors. Careful attention is given in the subprogram to redecomposition and to the prevention of cycling in the revised simplex algorithm. Several sample applications (all well-known) of linear programming to applied mathematics problems are also discussed. (ERA citation 05:002363)

SAND-79-0568C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Recovery of Dual Variables in Generalized Benders Decomposition.
J. Polito, T. L. Morin, and B. A. McCarl. 1979, 17p CONF-791043-3
Contract EY-76-C-04-0789

TIMS/ORSA national meeting, Milwaukee, WI, USA, 15 Oct 1979.

Direct application of Generalized Benders Decomposition to convex programing problems does not yield the dual variables as part of the solution. Simple computational formulas for recovering the dual variables are presented, and it is shown that the convergence criterion for the decomposition determines the accuracy of the computed dual prices. (ERA citation 05:003946)

13.

MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A086 753/1 PC **A10**/MF **A01**
GARD Inc Niles IL
Study of Alternate Material for Pedal Ventilator Kits.
Final rep. May 79-May 80,
John M. Buday. Apr 80, 205p Rept no. GARD-A1-16(1724)
Contract DCPA01-79-C-0234
Includes detachable summary.

The objective of this program was to conduct a study of alternate materials that could be utilized in the construction of a pedal ventilator kit (PVK). The goal of the study was to reduce unit cost in a large scale procurement. Cost savings and performance parameters were evaluated using the PVK developed in 1979 under Contract No. DCP01-78-C-0184 as a basis for comparison. A value analysis study was conducted on the PVK to determine viable material/design revisions that offered potential manufacturing economies. Based on the conclusions of the study, one optimum design was chosen for fabrication. Prior to fabrication, five breadboard support frames were constructed and tested. Fifteen fully assembled prototype pedal ventilator kits were constructed. Five of the PVK's were subsequently tested to assure compliance with performance and reliability requirements. Preliminary specifications and operating instructions were generated for the PVK. In addition, production cost estimates based on a procurement of 100,000 units were formulated for FEMA budgetary purposes. (Author)

AD-A086 757/2 MF **A01**
Naval Postgraduate School Monterey CA
Analysis of a Residential Heating System Utilizing a Solar Assisted Water-to-Air Heat Pump.
Master's thesis,
John R. Dunbar. Jul 79, 73p
Availability: Microfiche copies only.

The performance characteristics of a residential solar assisted water-to-air heat pump heating system were analyzed. A realistic residence and solar assisted water-to-air heat pump system were modeled for this northern climate using the transient simulation computer code TRNSYS developed by the University of Wisconsin. The system was studied over a one month winter period, December, using actual hourly weather data. The system was analyzed for both the cloudiest and clearest December weather recorded in the last 30 years. The collector area and storage tank capacity were varied and the effects on system performance were studied. Other parameters varied and studied are the collector/storage tank heat exchanger effectiveness and the room temperature.

AD-A086 842/2 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
A Study of Central Energy Monitoring and Control (CEMC) Systems.
Master's thesis,
William Lawrence Rudich. 9 May 79, 138p

The Central Energy Monitoring and Control (CEMC) systems began in the 1950s as an attempt to reduce rising labor costs in building management. The ensuing development of the computer and the mini-computer which created more sophisticated systems and the start of the 'energy crisis' started their application for energy reduction and optimization in facilities. This report explains the components of a computer-based CEMC system, its functions and its capabilities. Other types of systems are briefly described for comparison. The terminology peculiar to CEMC systems is defined and some of the systems available today are described. The results of questionnaires sent to present users of these systems are discussed. The problem with the specification and procurement of CEMC systems is presented. The source of the problem and some solutions proposed by other are given. The use of CEMC systems on College Campuses is discussed. The history of the proposed system installation on the University of Colorado Boulder campus is reviewed and updated. (Author)

AED-Conf-77-263-002 PC **A02**/MF **A01**
Schleswig-Holsteinische Stromversorgungs A.G., Rendsburg (Germany, F.R.).
Operational Experience with Electric Monovalent Heat Pumps.
K. H. Schwarze. 1977, 12p CONF-770999-5
In German.Conference on heat pumps, Essen, F.R. Germany, 27 Sep 1977.
U.S. Sales Only.

A cost comparison is made of the various heating systems, in the context of which the costs and profits of the public utilities come to the fore. (ERA citation 05:003261)

EUR-6667 PC **A08**/MF **A01**
Louvain Univ., Heverlee (Belgium). Lab. voor Warmteoverdracht en Reaktorkunde.
Analysis on Heat Pump Assisted Solar Energy Air Heating Systems: CEC-Solar Energy R and D Programme. Final Report.
1980, 154p
U.S. Sales Only.

A study is made of the performance of heat pump assisted solar energy air heating systems. Based upon experimental observation of the performance of the major components of such systems (solar collectors, heat pump, storage reservoirs) computation models are developed which allow the yearround energy savings of the systems to be calculated. In the present study these calculations are performed by referring to a standard meteorological year in Belgium. Considerable attention is given to the heat pump characteristics. Systems without storage reservoir as well as with one or two reservoirs are studied. The effects of system parameters as heat pump size, collector area, storage capacity, etc., upon system performance are investigated. It is found that heat pump assisted solar heating systems should have one storage reservoir and should allow for the use of outside air during heat pump operation. The relative cost of electrical energy and auxiliary energy is very important in estimating the impact of the heat pump. The average coefficient of performance of the heat pump is found to be 2. Directions are indicated in which research should be continued to further study the effects of heat pumps applied to solar systems. (ERA citation 05:020375)

EUR-6701 PC **Q04**/MF **A01**
European Heatpump Consultors Ltd., Charlottenlund (Denmark).
Feasibility Study on a Combined Summer Cooling and Winter Heating System, Based on a Combination of Solar Energy and Ground Heat Pumps.
M. Fordsmand, and A. Eggers-Lura. 1980, 54p

The system is planned for a semi-detached (row) one family house with an area of 103 m exp 2 on two floors. Three European locations chosen for the study are Copenhagen, Paris, and Marseille. The computer model is described and some results presented. (ERA citation 05:023883)

FRNC-R-57 MF **A01**
Grenoble-1 Univ. (France).
Valorization of the Energy Potential of Fossil and Fissile Fuels for Heat Production: Dual-Purpose Power Plants and Heat-Producing Nuclear Reactors.
M. Lavite. Jul 75, 39p
In French.
U.S. Sales Only. Microfiche copies only.

The heat market is analyzed briefly within the French context: present structures and characteristics of the market, current means of heat production, predictable trend of the demand. The possible applications of nuclear energy to heat production, through the agency of combined electricity-steam stations or heat-producing stations, are then examined. Nuclear solutions are compared with others from the technico-economic and ecological wiewpoints and an estimate fo their respective impacts on the energy balance is attempted. (Atomindex citation 11:503145)

NP-23670 PC **A03**/MF **A01**
Maine State Government, Augusta.
Discussion Paper on the Direct Use of Solar Energy in Residential and Commercial Buildings in the State of Maine.
1976, 36p

This paper, (based on library research and interviews with consumers, researchers, designers, builders, and marketers involved with solar technology in Maine) attempts to assess the technical and economic feasibilty, as well as societal effects, of direct use of solar energy in residential and commercial buildings in Maine. A description of a solar cost-benefit study designed specifically for Maine climates is included. Various problems confronting the solar industry are pointed out and recommendations for state action to correct those problems are made. (ERA citation 04:032977)

NP-24107 PC **A05**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Stuttgart (Germany, F.R.). Inst. fuer Bauphysik.
Economic Effects of Energy Conservation Measures in Newly Erected Residential Buildings. Part 1.
H. Werner, and K. Gertis. 1977, 89p
In German.
U.S. Sales Only.

The investigations cover a representative cross section of residential buildings, from one-family bungalows to multi-family multi-story dwellings. Different roof forms were taken into consideration, as well as corner- or centrally-located row houses and external or internal arrangements of the sanitation. When doing comparisons concerning the profitability, several heat protection stages were used. The investigations covered the amount of the necessary additional investments, the operating costs and the time required for implementation. In particular, it is concluded that the use of thermostat control valves is advantageous. (ERA citation 05:008778)

NP-24128 PC **A03**/MF **A01**
Verein Deutscher Ingenieure, Duesseldorf (Germany, F.R.). Gesellschaft Bildungswerk.
Domestic Heating with Heat Pump Systems.
G. H. Thiel. 1978, 34p
In German.
U.S. Sales Only.

After an introduction to the fundamentals of the use of different energy sources for heat pumps and an evaluation, the constructional physics requirements to minimize the heat demand are outlined. The advantages and disadvantages of various heating systems with heat pumps are explained. Examples of a heat balance are a single-family house with a swimming pool and a swimming pool as a specific problem. Finally, the possibilities of heat pump control are discussed. (ERA citation 05:004672)

NP-24423 PC **A02**/MF **A01**
Cyclone Furnace for Brown Coal.
R. Schulze. 15 May 54, 19p
A, Energie, 6 n5 P141-148 15 May 1954.
U.S. Sales Only.

The operating time of the brown coal cyclone boiler has so far been too short to give a definite opinion on its operation under continuous running. The initial difficulties with this new design, on which there was no previous experience, were in no way greater than with other known boiler and furnace types. The three months operation have shown that the specified figures have been confirmed and that the new design has come up to expectations in all essentials. The boiler plant operates reliably, and the cyclone furnace can be rapidly and flexibly adjusted to the steaming requirements. The boiler rating and efficiency, the slag flow and fusion rate, the crusher/drier efficiency and power consumption are satisfactory, and the real economy obtained in steam raising compares well with other furnaces firing Rhineland brown coal. As the result of the good experience obtained, a second cyclone boiler for firing brown coal has been ordered. This will be constructed as a Benson boiler with two cyclones for a steam output of 200 t/h, a pressure of 176 atmospheres and a steam temperature of 535 exp 0 C. (ERA citation 05:020037)

N80-27800/5 PC **A05**/MF **A01**
Lutz-Sotire Partnership, Stamford, CT.
Solar Heating System Installed at Stamford, Connecticut.
Final Report.
Sep 79, 83p NASA-CR-161436
Contract EX-76-C-01-2377
Sponsored in Part by DOE.

The solar heating system installed at the Lutz-Sotire Partnership Executive East Office Building, Stamford, Connecticut is described. The Executive East Office Building is of moderate size with 25,000 sq ft of heated space in 2 1/2 stories. The solar system was designed to provide approximately 50 percent of the heating requirements. The system components are described. Appended data includes: the system design acceptance test, the operation and maintenance manual, and as-built drawings and photographs.

N80-27802/1 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for Contemporary-Manchester, Manchester, New Hampshire.
Progress Report, Mar. 1979 - Feb. 1980.
30 Jul 80, 80p NASA-CR-161471
Contract NAS8-32036
Sponsored in Part by DOE.

The operational and thermal performance of the solar energy system, Contemporary-Manchester, is described. The system was designed by Contemporary Systems Incorporated to provide space heating and domestic hot water preheating for a three story dwelling located on the New Hampshire Vocational Technical College campus, Manchester, New Hampshire. The net fossil energy savings for the period from March, 1979 to February, 1980 was 14.52 million Btu. However, the performance of the system must be degraded due to the fact that the building was unoccupied throughout the data assessment and analysis period. The unoccupied status prevented the normal adjustment of heating and ventilating controls for maintenance of comfort levels within the building. This lack of occupancy also prevented the typical family hot water usage, which would have allowed for more realistic evaluation of the hot water subsystem.

N80-27806/2 PC **A04**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation-Seasonal Report for Elcam San Diego, San Diego, California.
Progress Report, Mar. - Sep. 1979.
May 80, 71p NASA-CR-161481
Contract NAS8-32036
Sponsored in Part by DOE.

The solar energy system, Elcam San Diego, was designed to supply domestic hot water heating for a single family residence located in Encinitas, California. System description, performance assessment, operating energy, energy savings, maintenance, and conclusions are presented. The system is a 'Sunspot' two tank cascade type, where solar energy is supplied to either a 66 gallon preheat tank (solar storage) or a 40 gallon domestic hot water tank. Water is pumped directly from one of the two tanks, through the 65 square feet collector array and back into the same tank. Freeze protection is provided by automatically circulating hot water from the hot water tank through the collectors and exposed plumbing when freezing conditions exist. Auxiliary energy is supplied by natural gas. Analysis is based on instrumented system data monitored and collected for one full season of operation.

PAT-APPL-6-037 078 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Long-Term Ice Storage for Cooling Applications.
Patent Application,
W. W. Schertz. Filed 8 May 79, 11p
Contract W-31-109-ENG-38
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A device is described for cooling a stored material and then for later use of the cold thus stored. The device includes a tank containing a liquid such as water which is frozen by means of a reflux condenser heat pipe. (ERA citation 05:029216)

PAT-APPL-6-037 079 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Free Piston Inertia Compressor.
Patent Application,
W. D. C. Richards, D. Bilodeau, T. Marusak, L. Dutram, Jr., and J. Brady. Filed 8 May 79, 11p
Contract EC-77-C-02-2911
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A free piston inertia compressor comprises a piston assembly including a connecting rod having pistons on both ends, the cylinder being split into two substantially identical portions by a seal through which the connecting rod passes. Vents in the cylinder wall are provided near the seal to permit gas to escape the cylinder until the piston covers the vent whereupon the remaining gas in the cylinder functions as a gas spring and cushions the piston against impact on the seal. The connecting rod has a central portion of relatively small diameter providing free play of the connecting rod through the seal and end portions of relatively large diameter providing a limited tolerance between the connecting rod and the seal. Finally, the seal comprises a seal ring assembly consisting of a dampener plate, a free floating seal at the center of the dampener plate and a seal retainer plate in one face of the dampener plate. (ERA citation 05:029217)

PATENT-4 167 819
Not available NTIS
Department of Energy, Washington, DC.
Pressure Regulator.
Patent,
R. W. Ebeling, Jr., and R. B. Weaver. Filed 5 Dec 77, patented 18 Sep 79, 4p PAT-APPL-857 649 Supersedes PAT-APPL-857 649-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The pressure within a pressurized flow reactor operated under harsh environmental conditions is controlled by establishing and maintaining a fluidized bed of uniformly sized granular material of selected density by passing the gas from the reactor upwardly therethrough at a rate sufficient to fluidize the bed and varying the height of the bed by adding granular material thereto or removing granular material therefrom to adjust the backpressure on the flow reactor. 2 claims. (ERA citation 05:029437)

PB80-201239 Not available NTIS
National Bureau of Standards, Washington, DC.
Very Low-Power Stirling Cryocoolers Using Plastic and Composite Materials.
Final rept.,
D. B. Sullivan, and J. E. Zimmerman. Nov 79, 3p
Sponsored in part by Naval Air Systems, Washington, DC.
Pub. in Proc. Int. Congress of Refrigeration (15th), Venice, Italy, Sep 79, Int. J. Refrig. 2, n6 p211-213 Nov 79.

An experimental investigation of several concepts for very-low-power cryocoolers for operating highly-sensitive superconducting devices has been undertaken. The devices to be cooled are those using Josephson junctions, such as SQUID magnetometers, voltage standards and A/D converters. The common basic feature of the concepts is that very low levels of magnetic, electric, and mechanical interference are potentially realizable.

PB80-201254 Not available NTIS
National Bureau of Standards, Washington, DC.
Economic Feasibility of Solar Applications to Office Buildings and Retail Stores.
Final rept.,
R. T. Ruegg. 1980, 7p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Proc. Solar Energy Market Analysis and Evaluation Contractor's Review Meeting, Washington, DC., p1-7, Apr 8-10, 1980.

Comprehensive economic optimization models and a computer program for evaluating the economic feasibility of active solar energy for commercial buildings are developed by this study. Data and assumptions for use in the models are compiled. The models are applied to assess the economic feasibility of active solar hot water and combined space heating and hot water systems for a new and an existing office building and retail store in 13 U.S. cities. Net savings (or losses) of the solar energy systems are estimated in present value dollars over a 20 year life cycle, based on a set of representative data and assumptions. Break-even values of system costs, energy prices, and future energy price escalation rates are also calculated to determine the minimum conditions under which the solar energy systems become cost effective for the selected office buildings and retail stores. Sensitivity analysis is conducted for other key variables. The relationship between net savings (losses) and the solar fraction is tested for selected cities.

PB80-201601 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Energy Conservation in Buildings: An Economics Guidebook for Investment Decisions.
Final rept.,
Harold E. Marshall, and Rosalie T. Ruegg. May 80, 155p NBS-HB-132
Library of Congress catalog card no. 80-600056.

This guidebook provides principles, techniques, step-by-step illustrations, and sample problems on how to evaluate the economics of energy conservation and solar energy investments. Techniques of economic evaluation including life-cycle costing, net benefits, savings-to-investment ratio, internal rate-of-return, and discounted payback analyses are described and compared in terms of their advantages and disadvantages. Discounting, a procedure for taking into account the time value of money, is illustrated in the analysis of an investment in heat pumps. Practice problems for discounting and for applying each of the five techniques are presented. Factors that affect benefits and costs, including time horizons, discount rates, inflation, incentives, taxes, salvage values, and measures of uncertainty, are discussed, and guidance is provided for selecting appropriate values for these factors when making economic evaluations. Comprehensive case illustrations for solar heating and for window design management are described. Appendices provide tables and formulae for evaluating the economics of alternative conservation investments.

PB80-203096 Not available NTIS
National Bureau of Standards, Washington, DC.
Test Results on Hot Water Systems Show Effects of System Design.
Final rept.,
A. H. Fanney, and S. T. Liu. May 80, 5p
Pub. in Proc. Symp. on Solar Hot Water Systems, Los Angeles, CA, 3-7 Feb 80, Solar Eng., p25-39 May 80.

Currently three computer programs, TRNSYS, f-CHART, and SOLCOST, are being extensively

used for the design and evaluation of solar space heating and domestic hot water systems. Although widely used, the accuracy of their predictions needs to be verified with experimental data. In order to provide data required for the validation of these computer programs for solar domestic hot water systems, the staff of the National Bureau of Standards fabricated and instrumented six typical systems at its Gaithersburg, Maryland site. The systems have been operating since June, 1978. This paper describes the testing done, the experimental results, and compares the experimental results with the computer predictions for the first twelve months of operation.

PB80-203391 Not available NTIS
National Bureau of Standards, Washington, DC.
Solar Heating Standards Activities in the United States.
Final rept.,
D. Waksman, and R. D. Dikkers. 1980, 10p
Pub. in Proceedings of Technical Meeting on Solar Energy Codes of Practice and Test Procedures, London (England), April 25, 1980, p89-98 1980.

This paper provides an overview of efforts that are currently underway in the United States to develop and implement standards for solar heating applications. A summary of standards development and building regulatory systems used in the United States is also provided.

PB80-205412 PC **A09**/MF **A01**
Solar Turbines International, San Diego, CA.
Industrial Waste Heat Recovery. Final Report for 1979,
M. E. Ward, N. G. Solomon, and C. E. Smeltzer.
Jan 80, 192p SR79-R-4796-12, GRI-78/0015
Contract GRI-5011-342-0087

One hundred fifty reports were reviewed along with interviews of some 12 recuperator manufacturers and research organizations. A majority of recuperators used in the U.S. are constructed of 300 and 400 series stainless steels which generally limit operation to 1300F. A general consensus reached was that in an oxidating environment current recuperator materials are limited to 1500F. The full size counter axial flow metal heat exchanger test module has successfully completed 50 test hours with exit temperatures of 1650F fired with gas temperature of 2000F. The successful operation of the full size heat exchanger above 1600F outlet temperature at 100 psia must be considered the major achievement of this project.

SAN-1304-T1 PC **A19**/MF **A01**
State Univ. of New York at Albany. Atmospheric Sciences Research Center.
Jolly Tiger Restaurant/Colonie, NY, Energy Conservation and Heat Reclamation Project. Final Report.
15 Aug 78, 450p
Contracts EY-76-C-03-1177, EY-76-C-03-1304

The project, from its beginning, has been a team effort between Federal, State, and local agencies. Section I describes the restaurant, its architectural features, mechanical systems, and purpose of the project. Section II describes the Data Acquisition System. Section III assesses the operation and performance of the restaurant as a whole, the several mechanical subsystems which were monitored during the 19 months of the project, and details investigations including baseline tests and human factor analyses. Section IV, Economic and Market Analysis, discusses the interrelationship between system configuration, equipment performance, cost, and the price of energy. It is concluded that, for both large and small restaurant entrepreneurs, implementation of some of the energy-conservation features will benefit the current and future financial environment. It was found that the system with the greatest economic value and minimum capital expenditure is the standard packaged rooftop unit, refrigeration rack, and dishwasher heat exchanger, utilizing LP gas as a supplemental heat source. The system with the greatest energy-conservation value and minimum capital expenditure is the standard packaged rooftop unit with 3000-gallon storage capacity, economizer, MUA Preheat, EARS, Dishwasher HX, and Refrigeration Rack Recovery. If the incremental capital expenditures are within the restaurant's budgetary constraints, the system with the greatest energy conservation value is the twin heat pump system with 3000 gallons storage and the same subsystems as above. Section IV also includes a market analysis of the energy-conservation and heat-reclamation systems. In Section V, Operational and Maintenance Experience and Equipment Modification are discussed and design and operational suggestions for restaurant designers and operators are given. Six Appendices supplement the information contained in the report. (ERA citation 05:003281)

SAN-1591-1 PC **A09**/MF **A01**
AiResearch Mfg. Co., Los Angeles, CA.
Development of a Solar Desiccant Dehumidifier. Volume 1. Summary. Volume 2. Detailed Technical Information. Technical Progress Report.
M. E. Gunderson, K. C. Hwang, and S. M.
Railing. 31 Mar 78, 176p
Contract EG-77-C-03-1591

Research and development work aimed at the development of a solar desiccant dehumidifier is described in detail. The system features a rotary bed of granular silica gel and a rotary regenerator. The dehumidifier can be used for air conditioning through adiabatic saturation of the process airstream. Detailed technical information is presented in the appendices: (A) management, (B) review of the literature: state-of-the-art survey and SERI meeting, (C) review of the literature: adsorbent survey, (D) design requirements and evaluation criteria, (E) design requirements and evaluation criteria, single-family house model, (F) design requirements and evaluation criteria, economic model, (G) design requirements and evaluation criteria: conventional system models for comparison, (H) candidate cooling subsystems, (I) subsystem computer model, (J) subsystem performance map, and (K) subsystem preliminary design. (ERA citation 05:008326)

SAN-1719-1 PC **A07**/MF **A01**
General Electric Corporate Research and Development, Schenectady, NY.
Solar Assisted Heat Pumps for the Heating and Cooling of Buildings. Six Month Progress Report, May 4-November 5, 1978.
Nov 78, 141p SRD-78-175
Contract ET-78-C-03-1719

Research and development of solar assisted heat pumps for the heating and cooling of buildings is described. Phase I requires the determination of the most cost effective solar assisted heat pump (SAHP) system. The SAHP systems considered are the series, three-coil, and cascade systems with electric resistance heat backup. Four reference systems are included: standard heat pump, two-speed heat pump, straight solar system, and parallel system. Performance characteristics of all major SAHP components are determined and used in conjunction with the simulation program TRNSYS to obtain system performance for the New York heating season. Two kinds of residential heat loads representing different construction of an 1800 ft exp 2 house are used. Different system control and component sizing strategies are explored. Material and installation costs are obtained for SAHP components and used in life cycle costing analysis to determine the economic viability of the various systems. (ERA citation 05:002799)

SAND-78-8175 PC **A05**/MF **A01**
Martin Marietta Corp., Denver, CO.
Heat Transfer in Packed Beds at Low Reynolds Number. Final Report.
F. C. Prenger, Jr. Dec 77, 94p
Contract EY-76-C-04-0789

Results from an experimental investigation of heat transfer in packed beds of low thermal conductivity particles is presented. At low Reynolds number flows through beds of fine particles the gas temperature and solids temperature differ substantially. An analytical model is proposed which treats this mechanism and is consistent with experimental results. A test apparatus was constructed and experimental results were obtained using air flowing through packed beds of sodium chloride and calcium chloride. Four heat transfer parameters were identified; bed thermal conductivity, heat transfer coefficient between the interstitial gas and the solids, and two heat transfer coefficients for the coolant tubes; one between the coolant tubes and the interstitial gas and one between the coolant tubes and the solid particles. Each coefficient is presented in terms of a single correlating parameter. A comparison between the analytical model and the test data for selected cases is also presented. (ERA citation 04:055349)

SERI/TP-69-412 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Communication Strategy to Commercialize Passive Solar Energy.
D. R. Wolcott, and F. F. Shoemaker. 1979, 6p
CONF-791022-10
Contract EG-77-C-01-4042
National passive solar energy conference, Kansas City, KS, USA, 3 Oct 1979.

Although certain technical and economic issues remain to be clarified, passive solar market development is increasingly dependent upon communications such as information dissemination, education, training and promotional activities. Target audiences are identified as both recipients and disseminators of passive solar communications. Form and quality of information are discussed in terms of the stages of an innovation adoption decision-making process. Several communication-related barriers which impede the commercialization of passive solar are discussed and general information and education responses are suggested. The paper ends with a statement of precepts which should guide passive solar communication programs. (ERA citation 05:002841)

SOLAR/0022-79/39 PC **A05**/MF **A01**
International Business Machines Corp., Huntsville, AL.
Project Monitor: Executive Summary; Introduction; and Summary and Recommendations. Final Report.
M. W. Weston. Jul 79, 86p CONF-790758-1
Contract EG-77-C-01-4049
DOE regional solar update conference, Dearborn, MI, USA, 11 Jul 1979.

Results derived from analysis of passive solar space heating systems in the National Solar Data Network are presented. Results are presented which describe the performance of these solar energy systems relative to the facets of design, control, and occupant interactions which provide for good system performance. Performance of passive solar space heating systems is illustrated in terms of system energy savings and thermal comfort conditions. (ERA citation 05:002842)

SOLAR/1017-79/14 PC **A04**/MF **A01**
International Business Machines Corp., Gaithersburg, MD.
Solar Energy System Performance Evaluation.
C. M. Fu. 1979, 66p
Contract EG-77-C-01-4049

The Facilities Development Gas Company site is a three-story, multifamily condominium consisting of 31 units in San Diego, California. Solar energy is used for preheating domestic hot water (DHW) for the complex. The solar energy system has an array of flat-plate collectors with a gross area of 520 square feet. The area faces south at an angle of 42 degrees to the horizontal. Potable water is the transfer medium that delivers solar energy from the collector array to storage. Solar energy is stored underground in an insulated 1000-gallon glass-lined tank. Preheated water from the storage tank is supplied, on demand, to 31 conventional 52-gallon DHW tanks. When solar energy is insufficient to satisfy the hot water load, two electrical heating elements, energized separately within the individual DHW tanks, provide auxiliary energy for water heating. (ERA citation 05:008361)

SOLAR/1017-79/50 PC **A03**/MF **A01**
Boeing Co., Huntsville, AL.
Solar Project Description for Facilities Development Corporation's Condomimium, San Diego, California.
D. Moore. 7 May 79, 42p
Contract EG-77-C-01-4049

This solar system is designed to provide preheated water to 31 individual domestic hot water tanks for the 31 unit condominium development. The

system has 524 square feet of double glazed flat plate collectors. Potable water is the heat transfer medium to the 1,000 gallon buried storage tank. The site, building, system, and performance evaluation instrumentation are described. Original cost estimates for provisioning and installation of the solar system are given. (ERA citation 04:052952)

SOLAR/1018-79/14 PC **A04**/MF **A01**
International Business Machines Corp., Gaithersburg, MD.
Solar Energy System Performance Evaluation.
J. E. Hughes. 1979, 66p
Contract EG-77-C-01-4049

The Stewart-Teele-Mitchell site is a single-family residence in Malta, New York. The home has approximately 1900 square feet of conditioned space. Solar energy is used for space heating the home and preheating domestic hot water (DHW). The solar energy system has an array of flat-plate collectors with a gross area of 432 square feet. The array faces south at an angle of 45 degrees to the horizontal. A glycol/water solution is the transfer medium that delivers solar energy from the collector array to a heat exchanger. Water is then used as the transfer medium that delivers solar energy from the heat exchanger to storage, and to the space heating and DHW loads. Solar energy is stored in the basement in a 1000-gallon insulated tank. Preheated city water is stored in a 75-gallon preheat tank and supplied, on demand, to a conventional 40-gallon DHW tank. When solar energy is insufficient to satisfy the space heating load, an oil-fired furnace provides auxilary energy for space heating. Similarly, an electrical heating element in the DHW tank provides auxiliary energy for water heating. (ERA citation 05:008330)

SOLAR/1030-79/14 PC **A04**/MF **A01**
International Business Machines Corp., Gaithersburg, MD.
Solar Energy System Performance Evaluation.
N. M. Labbe. 1979, 70p
Contract EG-77-C-01-4049

This Solar Energy System Performance Evaluation Report presents the results of a thermal performance analysis of the Chester West solar energy system. The analysis covers operation of the system from September 1978 through March 1979. The Chester West solar energy system provides space heating and domestic hot water to a single-family dwelling located in Huntsville, Alabama. Section 2 presents a summary of the overall results. A system description is contained in Section 3. Analysis of the system thermal performance was accomplished using a system energy balance technique described in Section 4. Section 5 presents a detailed assessment of the individual subsystems applicable to the site. (ERA citation 05:008331)

SOLAR/1056-79/14 PC **A04**/MF **A01**
International Business Machines Corp., Gaithersburg, MD.
Solar Energy System Performance Evaluation.
D. C. Fontaine. 1979, 71p
Contract EG-77-C-01-4049

M. F. Smith Associates is a single-family residence in Jamestown, Rhode Island. The home has approximately 1752 square feet of conditioned space. Solar energy is used for space heating the home and preheating domestic hot water (DHW). The solar energy system has an array of flat-plate collectors with a gross area of 512 square feet. The array faces 15 degrees west of south at an angle of 45 degrees to the horizontal. Water is the transfer medium that delivers solar energy from the collector array to storage and to the space heating and hot water loads. Solar energy is stored in a 3150-gallon concrete storage tank. City water is preheated in storage and in heat exchanger HW1, which receives energy from a coil at the output of the heat pump compressor. Preheated water is supplied, on demand, to a conventional 82-gallon DHW tank. Solar-heated water from the storage tank is directed to a heat pump or to an hydronic heat exchanger to provide space heating. (ERA citation 05:008332)

SOLAR/2014-79/60 PC **03**//MF **A01**
Mueller Associates, Inc., Baltimore, MD.
Solar Project Cost Report.
21 Apr 78, 34p
Contracts W-31-109-ENG-38, EX-76-C-01-2389

This report provides cost information for the solar heating and hot water system at the Blakedale Professional Center located in Greenwood, South Carolina. The solar energy system provides space heating and domestic hot water for half the office space at the Blakedale Professional Center. The system construction was concurrent with the building construction, and the system is a new installation. The system utilizes three banks of collectors, with a net area of 928 ft exp 2 and a gross area of 954 ft exp 2 , roof mounted in a sawtooth configuration with aluminized mylar reflectors on the backs of the supports. The collectors are double glazed and have copper absorber plates with a nonselective black coating. Storage capacity is 5,000 gallons and is provided by a steel storage tank covered with polyurethane insulation buried underground approximately 50 feet from the building. The construction costs of this solar space heating project are presented. (ERA citation 05:008333)

SOLAR/2036-79/50 PC **A03**/MF **A01**
PRC Energy Analysis Co., McLean, VA.
Solar Project Description.
H. J. Hale. 19 Jan 79, 50p
Contract EG-77-C-01-2522

The Page Jackson Elementary School in Charles Town, West Virginia has a solar energy system for space heating and cooling for the 52,600 square foot building. The 11,215 square feet of PPG double-glazed, flat-plate collectors face south at a 45 exp 0 angle to the horizontal. The collectors are piped in reverse return with insulated copper branch piping. The collectors are attached to the sawtooth framing and glass mirrors are attached to the north side of the frame. Copper absorber plates, with a black chrome selective coating, are soldered to copper tubing. The two 1/8 inch Herculite tempered glass glazings are separated from each other and the absorber plate by 3/8 inch airspaces. There is a 6 inch fiberglass insulating batt placed behind the uninsulated collectors. Overheat protection is provided by circulating storage water. Freeze protection is provided daily by automatically draining the collectors and the exterior piping after the collector pump turns off. Two insulated 10,000 gallon steel storage tanks are located in the mechanical equipment room and are connected in series. The tanks are insulated with 6 inches of sprayed urethane insulation which has an asbestos coating. No chilled water storage is provided. Space heating is provided by circulating warm storage water through five air handling units. A 780,000 Btu/hr oil-fired boiler is used for additional heating. Space cooling is provided by pumping hot storage water to a 100-ton absorption chiller. (ERA citation 05:008334)

SOLAR/2036-79/60 PC **A03**/MF **A01**
Mueller Associates, Inc., Baltimore, MD.
Solar Project Cost Report.
19 Jan 79, 34p
Contract EG-77-C-01-2522

This report provides detailed cost information for the Page Jackson Elementary School solar space heating and cooling project located in Charles Town, West Virginia. The solar energy system cools and heats the approximately 52,600 ft exp 2 school. The system was designed as an integral part of the building at the time the building was designed. The 11,215 ft exp 2 of collectors were manufactured by the PPG Industries, Inc. and serve as both part of the roof of the building and the solar collectors. For cooling, water is chilled by a 100-ton Trane packaged absorption water chiller. Solar heated water for use in space cooling and heating is stored in two 10,000 gallon hot water storage tanks. (ERA citation 05:008335)

SOLAR/2048-79/60 PC **A03**/MF **A01**
Mueller Associates, Inc., Baltimore, MD.
Solar Project Cost Report.
16 Mar 79, 34p
Contracts EG-77-A-01-4027, EG-77-C-01-2522

This report provides detailed cost information for the solar space heating project at the Concord Light Plant in Concord, Massachusetts. The system utilizes 92 flat-plate air collectors, manufactured by Sunworks, having a net area of 1737 square feet. Solar energy is stored in a rock thermal storage bin of 1210 cubic feet which is located in a corner of the garage. Auxiliary energy is provided by electrical resistance heaters. Category costs are listed for the Town of Concord, General Contractor's materials, General Contractor's labor, and subcontract costs. The subcontract costs include materials, labor, overhead and profit costs for the steelwork in the collector support system, the flashing and caulking, the storage bin masonry, the electrical power wiring, the controls (system), and the roofing. A further breakdown of these costs was obtained for the steelwork subcontract. The construction cost for this project was $99,350 not including general contractor overhead and profit and general and administrative costs. (ERA citation 05:008336)

STUDSVIK/E1-79/33 PC **A03**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Corrosion in Heating System with Plastic Piping: Theory and Operation Experiences.
K. Gott, and T. Kelen. Mar 79, 27p
In Swedish.
U.S. Sales Only.

Since the oxygen in the air can diffuse through the walls of plastic tubes and dissolve in the water, plastic pipings can cause corrosion problems, specially with carbon steel radiators. The report discusses connections between oxygen supply, total corrosion and oxygen concentrations. Operation experiences in this field are also mentioned. It has not been possible to deduce any definite limit for the highest acceptable oxygen supply to a carbon steel system. An estimate gives between 0.001 and 0.1 micrograms/m exp 2 s for the radiatorsurface in contact with water. (ERA citation 05:001228)

STUDSVIK/E1-79/76 PC **A02**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Heat Pipes Placed at the Surface.
K. G. Spaangberg. Apr 79, 10p
In Swedish.
U.S. Sales Only.

The aim of this project is to test and to demonstrate a movable pipe placed at the ground surface used in a district heating heat distribution system. The price for such a pipe is estimated to be one-half of the price for a conventional district heating pipe. Furthermore, such a pipe will be reusable. These two facts make it economically profitable to utilize sources of waste heat with shorter estimated lifetimes and which are placed at longer distances. The pipes are made of plastic and are insulated with polyurethane or mineral wool. Furthermore, an embankment is placed above the pipes to protect the pipe from damage. (ERA citation 05:004705)

TID-28856(Dr) PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Commercialization Strategy Report for Solar Water Heating.
F. H. Morse, and J. M. Davis. 35p

The commercial readiness of solar hot water heating is discussed. Some barriers to be overcome before this technology is ready to be used commercially are identified. Also identified are possible actions that might be considered to remove specific barriers. Technical, market/economics, environmental, and institutional readiness, and benefits analysis are discussed. (ERA citation 04:046221)

TID-3360(Sup.3) PC **A06**/MF **A01**
Department of Energy, Oak Ridge, TN. Technical Information Center.
Cooling Towers. Bibliography, January--December 1978.
D. O. Galde. Feb 79, 102p

Included are 382 citations to references on cooling towers for fossil-fuel or nuclear power plants. A few citations are included on other types of condenser cooling systems, e.g., cooling ponds and canals. The citations were taken from the DOE Energy Information Data Base (EDB) covering the period January 1978 through December 1978. Corporate, Personal Author, Subject, and Report

Number Indexes are provided. (ERA citation 04:036246)

13B. Civil Engineering

AD-A086 266/4 MF A01
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Rexmere Dam (Inventory Number NY 524), Delaware River Basin, Delaware County, New York, Phase I Inspection Report,
George Koch. Feb 80, 94p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which need to be evaluated and remedied. Additional hydrologic investigations are required to more accurately determine the site specific characteristics of the watershed. Using the Corps of Engineer's Screening criteria for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped by all storms which exceed 14% of the Probable Maximum Flood (PMF) inflow. A flood wave analysis, assuming a breaching of the dam, indicates that water surface levels downstream of the dam could reach depths which would pose significant danger to residents. The spillway is, therefore, adjudged as seriously inadequate and the dam is assessed as unsafe, non-emergency.

AD-A086 267/2 MF A01
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Rainbow Lake Dam (Inventory Number NY18), Upper Hudson River Basin, Hamilton County, New York. Phase I Inspection Report,
George Koch. Dec 79, 94p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Visual inspection of this dam and engineering analyses which have been performed revealed conditions which constitute a hazard to human life or property. As a result of these determinations the dam has been assessed as 'unsafe, emergency'. Serious leaks through the dam and along the interface between the dam and its foundation were noted. There was overall deterioration of the concrete and masonary sections. A void near the top of the masonry section provides evidence of past overtopping. Stability analyses performed for the structure indicate that under extreme loading conditions ice loading, 1/2 PMF, PMF safety factors against both sliding and overturning are unacceptable (below 1.0). Using the Corps of Engineer's Screening Criteria for the initial review of the spillway adequacy, it has been determined that the structure would be overtopped for all storms exceeding 4% of the Probable Maximum Flood (PMF). Due to the condition of the structure, it is questionable as to whether it could withstand a substantial flow over the crest. Therefore, a flood-wave analysis was performed. This analysis indicates that in the event of a complete breaching of the dam water surface levels downstream could reach depths which pose significant danger to residents. The spillway is, therefore, adjudged as seriously inadequate.

AD-A086 351/4 MF A01
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Dam Number 2. Inventory Number NY 780, St. Lawrence River Basin, Jefferson County, New York. Phase I Inspection Report,
John B. Stetson. 14 Feb 80, 146p
Contract DACW51-79-C-0001
Prepared in cooperation with Stetson-Dale Engineering Co., Utica, NY.
Availability: Microfiche copies only.

Dam No. 2, located near Antwerp, New York, is a concrete and stone work gravity dam and is classified as a high hazard. The dam impounds a small linear reservoir which is used to regulate flow into the Village of Antwerp water supply system. Visual inspections of the dam did not reveal conditions which constitute an immediate hazard to human life or property. No plans were available, however, surveys of the dam were made for this inspection. Additional studies should be undertaken to further evaluate conditions affecting the dam. Seepage has been located under the stone masonry wall of the south end of the dam at the junction of the wall and the bedrock. Stability computations performed on the dam indicate it is unstable under the loading condition of ice, seismic, and hydrostatic uplift forces, with an associated factor of safety against overturning of 0.92. Computations prepared using the Corps of Engineer's Screening Criteria have determined that the embankment would be overtopped for all storms exceeding approximately 1% of the PMF (Probable Maximum Flood). A dam break analysis, assuming a partial breaching of the south dam wall, indicates that water surface levels downstream of the dam would not rise appreciably more than if the dam does not break under high flows. The spillway is, therefore, adjudged as not seriously inadequate.

AD-A086 352/2 MF A01
Tippetts-Abbett-Mccarthy-Stratton New York
National Dam Inspection Program. Stilwell Lake Dam (Inventory Number NY 770), Phase I Inspection Report,
Eugene O'Brien. Dec 78, 115p
Contract DACW51-78-C-0024
Includes envelope with charts. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Visual observations made during the course of the inspection did not indicate any severe structural deficiency or mechanical malfunction which would aversely affect the immediate safety or stability of the dam. The total discharge capacity of the spillway and the regulating outlets is approximately 39,975 cfs. This is greater than the estimated Probable Maximum Flood (PMF) of 24,245 cfs, therefore, the project discharge capacity is adequate. No remedial measures are required to assure the safety of the dam at the present time.

AD-A086 356/3 MF A01
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Alpina Dam (Inventory Number NY 778), St. Lawrence River Basin, Lewis County, New York. Phase I Inspection Report,
John B. Stetson. 14 Feb 80, 96p
Contract DACW51-79-C-0001
Prepared in cooperation with Stetson-Dale Engineering Co., Utica, NY.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The Alpina Dam, an intermediate-sized dam with a low hazard classification, is a water level control structure owned by Niagara Mohawk Power Corporation located within the Military Reservation at Fort Drum. The dam is a concrete gravity weir military structure. The dam is located on the northern end of Mud Lake which is connected to Lake Bonaparte. Numerous summer residences are located on Lake Bonaparte. The downstream area below the dam is a training area on the reservation. No plans exist for the dam, however, field surveys were taken as part of this inspection.

AD-A086 357/1 MF A01
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Mine Lake Dam (Inventory Number NY 767), Lower Hudson River Basin, Orange County, New York. Phase I Inspection Report.
John B. Stetson. 14 Feb 80, 91p
Contract DACW51-79-C-0001
Prepared in cooperation with Stetson-Dale Engineering Co., Utica, NY. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Mine Lake Dam is classified as a small dam with a significant hazard potential. The dam is constructed of masonry and is 13.9 feet high and 516 feet in length. Over 300 feet of the dam's length is less that 8 feet in height. The dam's reservoir is only 25 acres. Popolopen Dam is located one mile above Mine Lake, while Stilwell Dam and reservoir is located a few hundred feet below Mine Lake Dam. The drainage area of the dam is 8.7 square miles. The structure forms an impoundment which is used for recreational purposes on the West Point Military Reservation. Hydrology computations prepared according to the Corps of Engineers' screening criteria establishes the spillway capacity of 1,492 cfs at 9.9 percent of the PMF with the PMF discharge at 15,070 cfs and the 1/2 PMF discharge at 7,170 cfs. Since the spillway cannot pass the 1/2 PMF discharge without overtopping the dam, the spillway is inadequate. The stability analysis determined three loading cases where the dam was unstable. Each of these cases involved uplift on the base of the dam due to hydrostatic forces in combination with the PMF, seismic loadings or ice loadings. Only the ice load occurs in a normal operating situation. The condition of uplift is plausible since seepage was observed at the juncture of the masonry spillway with the bedrock.

AD-A086 361/3 MF A01
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Popolopen Lake Dam (Inventory Number 768), Phase I Inspection Report,
Eugene O'Brien. 11 Mar 80, 102p
Contract DACW51-79-C-0001
Includes envelope with charts. Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Tippetts-Abbett-McCarthy-Stratton, NY.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examinations of the available documents and visual inspection of the Popolopen Lake Dam did not reveal any conditions which are unsafe. Using the Corps of Engineers screening criteria for initial review of spillway adequacy, it has been determined that the concrete dam would be overtopped for all storms exceeding approximately 12.2 percent of the Standard Project Flood. It is estimated that the abutments would be overtopped by 1.68 feet during the Standard Project Flood; however, since the dam is located in a valley with rock Abutments, overtopping will cause neither significant erosion nor undermine the foundation of the dam. Although the spillway capacity is inadequate from a hydraulic and hydrologic standpoint, the inadequacy will not affect the safety of the dam. No remedial measures are required to assure the safety of the dam at the present time; however, certain measures are recommended as follow: (1) Repair eroded zones in portion of the embankment, (2) Remove trees from toe of the dam, (3) Repair intakes of regulating outlets, (4) Prepare an O & M manual and establish a program of periodic inspections, and (5) Monitor seepage areas on the concrete facing of dam and spillway.

AD-A086 687/1 PC A04/MF A01
New Jersey Inst of Tech Newark Dept of Chemical Engineering

Control of Vapor Emissions from Hydrazine-Based Fuels.
Final rept. 1 Jul 79-30 Jun 80,
Gordon A. Lewandowski. 30 Jun 80, 53p
AFOSR-TR-80-0531
Grant AFOSR-79-0084

A theoretical study was made of four control devices as applied to vapor emissions of four hydrazine-based fuels. The fuels considered were: monomethyl hydrazine (MMH), hydrazine, H-70, and unsymmetrical dimethyl hydrazine (UDMH). The control techniques considered were: refrigeration, carbon adsorption, incineration, and scrubbing. Of these, refrigeration is not practicable; and too little is known about carbon adsorption to make a determination of its effectiveness. Design criteria were established for incinerators and scrubbers, and both were sized. A choice between the two must be made on an economic basis. (Author)

AD-A086 786/1 PC **A03**/MF **A01**
Naval Research Lab Washington DC
The 1979 NRL Air Quality Data.
Annual rept.,
A. Stamulis. 16 May 80, 40p NRL-MR-4228, AD-E000 441

This report is a summary of the air quality data measured and recorded during the calendar year 1979. This annual summary is part of a continuing series initiated in 1975. The variables summarized include ozone (O3), sulfur dioxide (SO2), nitric oxide (NO), nitrogen dioxide (NO2), total hydrocarbons (THC), methane (CH4), non-methane hydrocarbons (RHC), carbon monoxide (CO), air temperature, relative humidity, wind direction, and wind speed. The instruments in use at the NRL air monitoring station are interfaced to a data acquisition system which in turn is coupled to a magnetic tape recorder. The data input is for one month on a tape which is subsequently analyzed by the NRL air computer program and results in a monthly computer printout of the essential air quality data. Each of the monthly computer printouts is then analyzed and a digest of the information obtained is reported as the annual summary. Included in the report is some background information thought necessary in understanding the data. Finally, a brief description of the odor nuisance problem at NRL is described.

AD-A086 819/0 PC **A12**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
Seabrook Lock Complex, Lake Pontchartrain, Louisiana, Design for Wave Protection at Lock Entrance. Hydraulic Model Investigation.
Final rept. Apr 78-Feb 79,
Robert R. Bottin, Jr., and Kent A. Turner. May 80, 253p Rept no. WES/TR/HL-80-7

A 1:36-scale undistorted hydraulic model reproducing the proposed Seabrook Lock Complex, the Inner Harbor Navigation Channel at its junction with Lake Pontchartrain, portions of the New Orleans Lakefront Airport, the stepped seawall adjacent to Lakeshore Drive, and sufficient offshore area in Lake Pontchartrain to permit generation of the required test waves was used to investigate the design of proposed breakwaters with respect to wave action. The proposed breakwater plans involved the placement of either rubble-mound, sheet-pile, or floating structures, or various combinations of these structures arranged to provide wave protection to the lakeward entrance of the proposed lock. An 80-ft-long wave generator and an Automated Data Acquisition and Control System (ADACS) were utilized in model operation.

AD-A086 834/9 PC **A06**/MF **A01**
Search Inc Norman OK
Optimization and Test of the Ozone Cyanide Waste Treatment System at Tinker Air Force Base.
Final rept. 14 Jul 78-30 Sep 79,
Leslie E. Streebin, and Herbert M. Schornick. Dec 79, 111p AFESC/ESL-TR-79-49
Contract F08635-78-C-0205

A full-scale demonstration plant utilizing ozone/ultraviolet radiation for removal of cyanide from electroplating wastes was optimized and tested at Tinker Air Force Base, Oklahoma. The original design goal was to reduce cyanide concentrations to nondetectable limits in a waste stream (6.25 gallons per hour) containing up to 50,000 milligrams per liter cyanide. Study results are supplemented by a review of literature related to ozone oxidation. The report summarizes equipment operational and plant design deficiencies identified and corrected. Major problems included compressors breakdown, oil carry-over, inefficient air filters, inoperable dryers, inadequate ventilation, low power output from ozone generators and an inefficient ozone contact system.

AD-A086 877/8 PC **A06**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
The Construction of an Embankment with Frozen Soil.
Special rept.,
James J. Botz, and Wilbur M. Haas. May 80, 114p Rept no. CRREL-SR-80-21

This paper presents the construction procedure, data and analysis from an experimental field program to determine the rippability and compaction characteristics of frozen soil. Also investigated was the stability upon thawing of the frozen soil compacted in the field. A test embankment, 60 feet by 20 feet and 4.5 feet high, was constructed of two sandy soils by conventional construction techniques. The material was ripped with a tractor-mounted ripper, hauled with a dump truck and compacted with a sheepsfoot roller. The embankment was instrumented for settlement and soil temperature. Field and laboratory testing was conducted toanalyze the deformation in the embankment with an elastic method and a finite element computer solution. Also the frozen chunks, produced in the ripping operation, were analyzed to determine the rippability of the frozen ground. From the results of the experimental program, several important conclusions concerning winter earthwork were obtained (1) Ripping frozen soil can be accomplished with heavy equipment which will produce a large range of chunk sizes. (2) The effectiveness of field compaction of frozen material is highly dependent on the moisture content of the soil, and (3) The magnitude of settlement in embankments constructed of frozen material is closely related to the compacted dry density of the plased soil. (Author)

AD-A086 878/6 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
Seabrook Lock Complex, Lake Pontchartrain, Louisiana; Design for Wave Protection at a Temporary Entrance during Various Phases of Lock Construction. Hydraulic Model Investigation.
Final rept.,
Robert R. Bottin, Jr. Jun 80, 77p Rept no. WES/TR/HL-80-8
See also Rept. no. WES/TR/HL-80-7, AD-A086 819.

A 1:36-scale undistorted hydraulic model reproducing the site of the proposed Seabrook Lock Complex. The Inner Harbor Navigation Canal at its junction with Lake Pontchartrain, portions of the New Orleans Lakefront Airport, the stepped seawall adjacent to Lakeshore Drive, and sufficient offshore area in Lake Pontchartrain to permit generation of the required test waves was used to investigate the design of proposed breakwaters with respect to wave action. The proposed breakwater plans involved the placement of sheet-pile and floating structures arranged to provide wave protection to a temporary entrance during various phases of lock construction. An 80 -ft-long wave generator and an Automated Data Acquistion and Control System (ADACS) were utilized in model operation.

BCRA-24 PC **A04**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Proceedings of the Symposium on Tar Acid Extraction, 11 April 1978.
Mar 79, 59p CONF-7804167-
Symposium on tar acid extraction, Wingerworth, Chesterfield, UK, 11 Apr 1978.
U.S. Sales Only.

Problems associated with acid tar extraction and the disposal of the resultant wastes are presented. The shortcomings of the traditional extraction route employing caustic soda and the alternative of a solvent extraction process are discussed. (ERA citation 05:021665)

BCRA-63 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Comparison Between the Quantity of Benzene-Soluble Material and Cyclohexane-Soluble Material in Various Atmospheres.
Jan 79, 12p
U.S. Sales Only.

The study of analytical methods in relation to coking-plant atmospheric pollutants and other related industrial situations was continued. The benzene-soluble material (BSM) and cyclohexane-soluble material (CSM) contents of various atmospheric particulate samples were determined in order to find if any clear relationship exists between the two quantities. The ratio of CSM to BSM was found to be reasonably constant for a given sampling technique, making the use of CSM rather than BSM a possibility for the assessment of the nature of coke-oven atmospheres. The main advantages of any future use of CSM rather than BSM would be the lower toxicity of cyclohexane and the narrower range of apparently relevant compounds extracted. Nevertheless, whilst cyclohexane extracts fewer non-PAH and non-carcinogenic compounds than benzene, it still extracts many compounds which are probably harmless. (ERA citation 05:021675)

CONF-800543-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Best Approach to Impact Assessment is to Use Empirically Based or Simulation Models to Forecast Impacts. Environmental Sciences Division Publication No. 1538.
S. W. Christensen. 1980, 25p
Contract W-7405-ENG-26
National workshop on entrainment and impingement, San Francisco, CA, USA, 5 May 1980.

This paper advocates the utility of mathematical models, as contrasted with statistical procedures and processional judgment, for assessing environmental impacts. While it would be desirable to use statistical tests to detect and estimate impacts, this is generally difficult or impossible to do, even with existing sources of impact. Empirical modeling, supported by statistical analyses when possible, is proffered as the logical alternative. Next, for purposes of forecasting impacts, the use of models as opposed to professional judgment or experience is considered. The conclusion is reached that, while models cannot answer all of the relevant questions, they can be used effectively and can address problems that are beyond the reach of statistical methods. (ERA citation 05:024024)

E80-10152 PC **A03**/MF **A01**
California Univ., Berkeley. Space Sciences Lab.
Remote Sensing Analysis of Water Quality and the Entrapment Zone in the San Francisco Bay and Delta.
Final rept. 15 Mar 78-14 Aug 79,
Robert N. Colwell, Allen W. Knight, and Siamak Khorram. 14 Aug 79, 41p SSL-SER-20-ISSUE-42, NASA-CR-163169
Grant NsG-5256
Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, SD. 57198. Prepared in cooperation with California Univ., Davis. Water Resources Center.

The author has identified the following significant results. Data from an ocean color scanner flown on a U-2 aircraft at 65,000 ft and from LANDSAT MSS were enhanced to identify biologically active areas of San Francisco Bay, and to determine the salinity, turbidity, chlorophylls, and suspended solids. The best fit regression models for mapping water quality parameters were based on bands 3,5,7, and 10. Comparison of the results indicates that chlorophyll concentrations can best be estimated by the OCS or MSS data. Salinity can best be estimated by OCS data; turbidity can best be estimated by LANDSAT data. Neither OCS nor MSS data provide reliable basis for estimating suspended solids. Aerial photography of the highest

quality taken with either conventional color or infrared-sensitive color films was unable to locate the biologically active areas.

KFK-2647-UF PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer Aerosolphysik und Filtertechnik 1.
Methods for Registration and Mapping of Waste Heat Emissions and Their Application to the Regions of Rastatt, Baden-Baden and Karlsruhe-City (Federal Republic of Germany).
G. Bartholomaei, and W. Kinzelbach. May 78, 76p
In German.
U.S. Sales Only.

Methods are developed that allow the registration and mapping of waste heat emissions on a grid of 2 x 2 km exp 2 . They are directly applicable in the Federal Republik of Germany and may be extended to neighbouring countries. Such a mapping provides the distribution of anthropogeneous waste heat emissions in space and time and serves in the case of the upper Rhine Valley as a basis for the numerical evaluation of climate modification by man. In a close approximation the distribution of waste heat is equal to the distribution of energy consumption. Therefore, the first step is the registration and mapping of energy consumption. Data about the consumption of the most important types of energy such as coal, fuel oil, gas, electricity etc. are available only partially and on the level of administrative units which are considerably larger than the grid size. Therefore, models were developed which allow to determine energy consumption on the commune and grid level with the help of local structural data like the distribution of population, households, traffic etc. The second step to be taken is the transformation of energy of energy consumption into waste heat emissions categorized in terms of the components convection, radiation, latent heat and discharge of heated water. Energy consumption and waste heat were determined separately for the various sectors of economy. Large sources in the industrial and energy supply sectors were analyzed individually by questionnaires. The results obtained with foresaid methods in the districts of Rastatt and Baden-Baden and in the township of Karlsruhe are presented. (orig.) 891 HP. (Atomindex citation 10:430241)

NP-23880 PC **A04**/MF **A01**
Bundesanstalt fuer Gewaesserkunde, Coblenz (Germany, F.R.).
Study of the Influence of Cooling Water Additives on Surface Waters.
M. Wunderlich. Feb 78, 61p
In German.
U.S. Sales Only.

The study is intended to give a survey of the present state of the applications of chemicals in cooling processes. The influence of these agents on surface waters increases with the increasing use of circulation cooling. Basis of the study is a literature survey and an elaboration by two professional organizations, which had been suggested by the Federal Institute of Hydrology. On this basis, model computations were carried out in the form of limiting-value determinations for a single power station with circulation cooling, involving the most important cooling water treatment agents. The study shows that at present and in the foreseeable future, cooling water agents are not of global significance. Regionally, however, low discharge streams may be influenced by the chemical additives. Recommendations to producers, distributors and users of cooling water chemicals are given. Questions still open are indicated. (ERA citation 04:052223)

NP-23961 PC **A03**/MF **A01**
California Energy Commission, Sacramento.
Summary of the Utility Common Forecasting Methodology II: Demand Forecast Submissions. Staff Report.
D. Joyner, and A. Husted. Jun 78, 42p

This report summarizes the electricity sales and peak demand forecasts submitted by five major California utilities pursuant to the regulations governing the common forecasting methodology (CFM II). The utilities' CFM I submissions and the Energy Commission's adopted forecasts are presented for comparison. Six tables provide an overview of the sales and peak forecasts contained in the utility CFM II demand forecast submittals. In Table 1, the utilities combined project electricity sales to increase at an average rate of 4.2% annually through 1998 as compared to a 3.8% increase over the past ten years. The peak demand forecasts in Table 2 are projected to grow at slower rates than total electric sales, with growth averaging 3.6% annually. The disaggregation by sector (Table 3) indicates that commercial electric sales are projected to grow fastest with an average rate of 4.9% annually over the twenty year period. The industrial sector follows second (4.3%) with the residential (3.7%) and other (2.3%) sectors experiencing the lowest growth rates. Considerable variation exists in the projections of real prices of electricity among utilities (Table 4). Except for Southern California Edison, the utilities are projecting a decline in real electricity prices over the next twenty years. Table 5 portrays the economic growth assumptions that are used to drive the utilities' electricity forecasting models. In Table 6, the economic projections made by recognized forecasters are displayed to serve as benchmarks. (ERA citation 04:056808)

NUREG/CR-1494 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Interaction of Uranium Mill Tailings Leachate with Soils and Clay Liners: Laboratory Analysis/Progress Report.
Technical rept.,
G. W. Gee, A. C. Campbell, D. R. Sherwood, R. G. Strickert, and S. J. Phillips. Jun 80, 83p PNL-3381

Laboratory tests were conducted to evaluate leachate from uranium mill tailings and its interaction with materials taken the Morton Ranch Uranium Mill site in central Wyoming. Laboratory tests included: Physical and chemical characterization of geologic materials from the Morton Ranch. Physical and chemical characterization of acid leach tailings and tailings solution from the nearby Exxon Highland Mill. Leaching tests with selected tailings materials and leach solutions. Adsorption studies measuring the sorption characteristics of heavy metals and radionuclides on the Morton Ranch geologic materials under low and neutral pH conditions. Clay liner stablity tests.

NUREG/CR-1495 PC **A05**/MF **A01**
Batteile Pacific Northwest Labs., Richland, WA.
Model Assessment of Alernatives for Reducing Seepage from Buried Uranium Mill Tailings at the Morton Ranch Site in Central Wyoming.
Technical progress rept.,
R. W. Nelson, A. E. Reisenauer, and G. W. Gee. Jun 80, 86p PNL-3378

A model assessment was made to evaluate contaminant transport to groundwater from clay lined and partially lined pits containing uranium mill tailings. The assessment involved combined subsurface fluid flow and contaminant transport modeling for four alternatives for controlling seepage from buried tailings. The input hydrologic soil characteristics were measured on materials typical of those found at the Morton Ranch, uranium mill site in central Wyoming. The assessment included combined saturated and partially saturated flow and contaminant transport models for two dimensional vertical cross sections typical of the tailings burial pits proposed for use at Morton Ranch. The results obtained from the models were contaminant flow paths away from the tailings pits, the advancing contaminant flow fronts for various sorbed and non-sorbed constituents of major environmental concern and the associated quantities of contaminant flow for each of the alternatives.

N80-27832/8 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Coordinated Aircraft and Ship Surveys for Determining Impact of River Inputs on Great Lakes Waters. Remote Sensing Results.
C. A. Raquet, J. A. Salzman, T. A. Coney, R. A. Svehla, and D. F. Shook. Jul 80, 105p NASA-TP-1694, E-172

The remote sensing results of aircraft and ship surveys for determining the impact of river effluents on Great Lakes waters are presented. Aircraft multi-spectral scanner data were acquired throughout the spring and early summer of 1976 at five locations: the West Basin of Lake Erie, Genesee River - Lake Ontario, Menomonee River - Lake Michigan, Grand River - Lake Michigan, and Nemadji River - Lake Superior. Multispectral scanner data and ship surface sample data are correlated resulting in 40 contour plots showing large-scale distributions of parameters such as total suspended solids, turbidity, Secchi depth, nutrients, salts, and dissolved oxygen. The imagery and data analysis are used to determine the transport and dispersion of materials from the river discharges, especially during spring runoff events, and to evaluate the relative effects of river input, resuspension, and shore erosion. Twenty-five LANDSAT satellite images of the study sites are also included in the analysis. Examples of the use of remote sensing data in quantitativley estimating total particulate loading in determining water types, in assessing transport across international boundaries, and in supporting numerical current modeling are included. The importance of coordination of aircraft and ship lake surveys is discussed, including the use of telefacsimile for the transmission of imagery.

N80-27833/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Annoyance Due to Noise and Air Pollution to the Residents of Heavily Frequented Streets.
H. U. Wanner, B. Wehrli, J. Nemecek, and V. Turrian. Apr 80, 23p NASA-TM-75496
Contract NASW-3198
Transl. Into English from Sozial und Praeventivmedizin, Zurich V. 22, 1977 p 108-122. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The residents of different streets with varying traffic density and building density were questioned about annoyance due to traffic noise and air pollution. Results show that annoyance felt is dependent not only on the measured noise levels and/or air pollution concentrations, but that there do exist interactions between the residential quarters and annoyance. These interactions should be considered when fixing the limits and standards.

N80-27834/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Noise Levels Near Streets, Effectiveness and Cost Abatement Measures.
J. Lang. Apr 80, 11p NASA-TM-75814
Contract NASW-3198
Transl. Into English of Conf. Paper "Laermbelastung an Strassen, Wirksamkeit und Kosten von Laermschutzmassnahmen" Vienna, Oal-Fachtagung p 156-162. Transl. By Scientific Translation Service, Santa Barbara, Calif. Presented at Tech. Conf. Of the Oeal, Vienna, 1978.

During the years 1975-1978, research was carried concerning the current noise levels near streets, the annoyance felt by the population, possible noise abatement measures for these streets, and the economic impact of such measures. The results of the research are summarized.

N80-27835/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Construction and Application of a Questionnaire for the Social Scientific Investigation of Environmental Noise Effects.
R. Guski, U. Wichmann, B. Rohrmann, and H. O. Finke. May 80, 29p NASA-TM-75492
Contract NASW-3199
Transl. Into English from Z. Fur Sozialpsychologie (Germany, F.R.). V. 9, 1978 p 50-65. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

A social psychological questionnaire was developed to study the effects of environmental noise and was applied to 636 people living in 19 different areas of Hamburg. The theoretical foundations and the statistical means employed in its development are described. Four main reactions to noise are isolated statistically, and it is determined that these are moderated by several intervening variables, chief of which are coping capacity for noise, the perceived dangerousness of the noise source, other daily loads, and the individual's lability.

PAT-APPL-6-026 508 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Terpolymerization of Ethylene, Sulfur Dioxide and Carbon Monoxide.
Patent Application,
R. Johnson, and M. Steinberg. Filed 3 Apr 79, 24p
Contract EY-76-C-02-0016
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to high molecular weight terpolymer of ethylene, sulfur dioxide and carbon monoxide stable to 280 exp 0 C and containing as little as 36 mo1% ethylene and about 41 to 51 mo1% sulfur dioxide, and to the method of producing said terpolymer by irradiation of a liquid and gaseous mixture of ethylene, sulfur dioxide and carbon monoxide by means of Co-60 gamma rays or an electron beam, at a temperature of about 10 to 50 exp 0 C, and at a pressure of about 140 to 680 atmospheres, to initiate polymerization. (ERA citation 05:028927)

PATENT-4 161 687
Not available NTIS
Department of Energy, Washington, DC.
Method for Locating Underground Anomalies by Diffraction of Electromagnetic Waves Passing between Spaced Boreholes.
Patent,
R. J. Lytle, D. L. Lager, E. F. Laine, and D. T. Davis. Filed 12 Sep 77, patented 17 Jul 79, 6p
PAT-APPL-832 490
Supersedes PAT-APPL-832 490-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Underground anomalies or discontinuities, such as holes, tunnels, and caverns, are located by lowering an electromagnetic signal transmitting antenna down one borehole and a receiving antenna down another, the ground to be surveyed for anomalies being situated between the boreholes. Electronic transmitting and receiving equipment associated with the antennas is activated and the antennas are lowered in unison at the same rate down their respective boreholes a plurality of times, each time with the receiving antenna at a different level with respect to the transmitting antenna. The transmitted electromagnetic waves diffract at each edge of an anomaly. This causes minimal signal reception at the receiving antenna. Triangulation of the straight lines between the antennas for the depths at which the signal minimums are detected precisely locates the anomaly. Alternatively, phase shifts of the transmitted waves may be detected to locate an anomaly, the phase shift being distinctive for the waves directed at the anomaly. 9 claims. (ERA citation 05:029462)

PB80-196553 PC **A10**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Dept. of Mechanical Engineering.
Physicochemical Treatment of Industrial Effluents Containing Lignosulfonate and Pentachlorophenate.
Technical rept. (Final), 1977-1980,
Lawrence K. Wang, Mu Hao Wang, and Zaida Sanabria Ramirez. Jun 80, 219p SIT-ME/06-80/11
Sponsored in part by Carborundum Co., Niagara Falls, NY. Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, NY.

Feasibility studies of treating industrial effluents containing lignosulfonate and pentachlorophenate by chemical coagulation, lime precipitation, carbon adsorption, and carbon dioxide treatment are conducted and documented. Analytical methods for quantitative determinations of lignin and pentachlorophenate in industrial effluents are developed and presented.

PB80-198484 PC **A04**/MF **A01**
Southern California Edison Co., Rosemead.
Wet/Dry Cooling Tower Test Module.
Final rept. Aug 77-Jul 79,
D. M. Burkart. Apr 80, 61p EPA/600/7-80-078
Grant EPA-R-805220

The report gives results of an evaluation of the engineering performance of a single-cell wet/dry cooling tower (about 25 MW) in an 18-month field test at San Bernardino, CA. Test objectives included determination of the water conservation and operating characteristics, and verification of a mathematical model for the wet/dry cooling tower.

PB80-198542 PC **A06**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Annotated Bibliography on the Ecology and Reclamation of Drastically Disturbed Areas.
General technical rept.,
Miroslaw M. Czapowskyj. 1976, 102p NEFES/80-85, FSGTR-NE-21

This bibliography contains 591 annotated references to literature, mainly on mining effects and reclamation in the coal regions of the United States. Each reference is indexed by area, material (coal, ore waste, etc.), and general subject.

PB80-198559 PC **A06**/MF **A01**
Pennsylvania Dept. of Transportation, Harrisburg. Bureau of Materials, Testing and Research.
Frost Action Effects on Pavements. Volume 1. Technical Report.
Final rept. 1970-78,
Gary L. Hoffman, Gaylord Cumberledge, and Amar C. Bhajandas. May 79, 120p FHWA-PA-RD-68-30-1
See also Volume 2, PB80-198567.

Prompted by the continuing frost damage experienced throughout Pennsylvania, the Pennsylvania Department of Transportation, Bureau of Materials, Testing and Research initiated a research project in 1969 to evaluate the frost problem in the State. This research project deals primarily with statistically analyzing freezing index variation, frost depth prediction techniques and ensuing appropriate frost design changes. Data for these analyses are available from 14 field test sites across Pennsylvania which have been monitored monthly throughout the last 8 freezing seasons. Frost depths predicted by two theoretical methods and one empirical method are statistically regressed with actual maximum frost depths at the field sites. The sensitivity of the prediction to variations in the pertinent dependent variables are also considered. The best prediction technique for the Pennsylvania data set is chosen, and comments on obtaining realistic input variables are made.

PB80-198567 PC **A12**/MF **A01**
Pennsylvania Dept. of Transportation, Harrisburg. Bureau of Materials, Testing and Research.
Frost Action Effects on Pavements. Volume 2. Data Summary.
Final rept. 1970-78,
Gary L. Hoffman, Gaylord Cumberledge, and Amar C. Bhajandas. May 79, 272p FHWA-PA-RD-68-30-2
See also Volume 1, PB80-198559.

This research project deals primarily with statistically analyzing freezing index variation, frost depth prediction techniques and ensuing appropriate frost design changes. Data for these analyses are available from 14 field test sites across Pennsylvania which have been monitored monthly throughout the last 8 freezing seasons. This volume has the following table of contents: Pertinent field test site information; Acquired data summary; Analyses of data.

PB80-198575 PC **A07**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Management and Technical Procedures for Operation and Maintenance of Air Pollution Control Equipment,
David B. Rimberg. Jun 79, 141p EPA-905/2-79-002
Contract EPA-68-02-2535

This manual supplies agencies and industrial users with management and technical guidelines for effective operation and maintenance of air pollution control equipment. The manual covers four major topics. Section 1 discusses organization of maintenance operation, maintenance job planning and scheduling, maintenance work measurement, preventive maintenance, maintenance material control, budgets, and training. Sections 2 through 4 discuss the three major types of air pollution control equipment: baghouses, electrostatic precipitators, and scrubbers. Emphasis is placed on simplified startup, operating, and shutdown procedures. Routine inspection procedures are supplemented with detailed checklists. A general program is presented for troubleshooting air pollution control equipment. Case histories for a pulse-jet baghouse, dry and wet electrostatic precipitators, venturi scrubber, and packed tower are included in the appendix to provide the user with a sample program for improving equipment performance reliability. Section 5 discusses equipment and components common to all types of air pollution control equipment, such as hoods, ducts, fans, and stacks. Section 6 provides the details of the tools and equipment required to perform inspection and maintenance satisfactorily.

PB80-198583 PC **A10**/MF **A01**
Bogert (Clinton) Associates, Fort Lee, NJ.
Upgrading Primary Tanks with Rotating Biological Contactors.
Final rept. Sep 76-Aug 79,
Alonso Gutierrez, Ivan L. Bogert, O. Karl Scheible, and Thomas J. Mulligan. Mar 80, 218p EPA-600/2-80-003
Prepared in cooperation with Hydroscience, Inc., Westwood, NJ.

A one-year experimental program was conducted at Edgewater, New Jersey, to evaluate the concept of upgrading existing primary wastewater treatment plants to the primary sedimentation tanks. The basic concept was to horizontally divide a primary sedimentation tank into two zones by installing an intermediate floor at mid-depth. Four RBS's were placed in the upper zone above the intermediate floor. This zone provided separate biological contact and treatment of the incoming wastes, while the lower zone functioned as a secondary sedimentation zone. Such a configuration would minimize the need for additional tankage and clarifiers, and would be especially suited to plants with limited space. The experimental program was conducted in three phases over a full year.

PB80-198617 PC **A14**/MF **A01**
Environmental Protection Agency, Washington, DC. Municipal Construction Div.
Handbook of Procedures: Construction Grants Program for Municipal Wastewater Treatment Works (Second Edition).
Technical rept.
1980, 311p
Supersedes PB-257 263.

This handbook identifies and explains the many procedures to be followed by those in the Regional Offices and the States who are responsible for bringing municipal wastewater treatment projects from their conception to completion. The procedures are set forth sequentially and are expressed in logical and concise terms. The operational tasks described are applicable to the program as a whole and are intended to serve as an operational standard so that this complex, multifaceted Construction Grants Program can move forward as a national program, uniformly administered.

PB80-199151 PC **A04**/MF **A01**
Ohio Dept. of Transportation, Columbus. Bureau of Tests.
Development of Laboratory and Field Methods for Detecting D-Cracking Susceptibility of Ohio Coarse Aggregates in Concrete Pavements.
Final rept.,
John T. Paxton, and William R. Feltz. Oct 79, 58p FHWA/OH-79/008

The phenomenon known as D-cracking cannot be detected in concrete pavements, prior to its appearance at the surface, by any non-destructive method other than coring. Several potential methods of detection available to the researchers were investigated on test slabs and actual pavements without success. Drilling of cores near the intersection of the logitudinal and transverse joints and visual examination of these cores will detect the advent and/or extent of D-cracking near the bottom of a pavement slab. Several laboratory test methods were analyzed which it was hoped would indicate the D-cracking susceptibility of coarse aggregates, when used in concrete for pavement slabs. Two methods were modified versions of

ASTM C-666 A and B, two were unconfined freeze-thaw tests of the aggregate and the remaining two were standard sodium and magnesium soundness tests. The major modification of the ASTM C-666 test methods was to substitute the elongation of the test specimens measured as they undergo cycles of freezing and thawing for the weight loss determinations or sonic modulus determination. Further modifications included plotting the percent expansion against the number of cycles completed and calculating the area under the curve generated.

PB80-199177 PC **A04**/MF **A01**
Radian Corp., Austin, TX.
Survey of Air Pollution Control Technology, Research and Development; Public and Private Roles in Undertaking and Stimulating Innovation: Survey of Eight Air Pollution Control Technology Innovations.
Final rept.
May 80, 62p RAD-80-203-003-01, AQ-7421-15A
Contract 15-AQ-7421

This report discusses fabric filters; spray drying; atmospheric and pressurized atmospheric fluidized bed combustion; hydrodesulfurization; side-stream separators; cat-ox scrubbing; and physical coal cleaning. Beyond brief description of the technology, the report emphasizes goals and motivations of the development and participants in the development. The report is part of a study that examines the regulatory, political and market climate in which air pollution control technology is developed, and which will make recommendations to the U.S. Congress about improving that climate, if necessary.

PB80-199201 PC **A06**/MF **A01**
Texas Univ. at Austin. Center for Highway Research.
Strength and Behavior of Stage-Cast Inverted T-Beams.
Final rept.,
Richard W. Furlong. Aug 78, 107p CFHR-3-5-75-188-2F, FHWA-TX-78-188-2F
Prepared in cooperation with Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div.

On the basis of tests involving both positive moment and negative moment loading on inverted T-beams, the performance and strength of monolithically cast specimens and stage-cast specimens were compared. Variables included the ratio between flange depth and overall beam depth and the amount of tensile reinforcement used in negative moment specimens. It can be concluded that the positive moment behavior of the stage-cast beams was just as strong, and actually stiffer and more ductile than the behavior or monolithic cast specimens under service load forces. At service load forces the negative moment stage-cast specimens displayed the same stiffness and ductility as monolithic cast specimens, and they were just as strong as monolithic cast specimens only for the beams with a flange thickness to beam depth ratio of 0.41. Specimens with the flange thickness to beam depth ratio equal to 0.27 did not possess in the stage-cast specimens as much strength or ductility as did the monolithic cast beams. It was also observed that undesirable cracking can remain in the stage-cast beams if crack sizes on the flanges during construction are allowed to reach the limit size (0.004 in.) before web concrete is cast and cured.

PB80-199672 PC **A02**/MF **A01**
Caribbean Research Inst., St. Thomas, VI. Water Resources Research Center.
The Water Economy of a Low Flush Toilet in a Water Deficient Region.
Technical rept. Mar 77-Sep 78,
Albert E. Pratt. Jul 79, 25p TR-3, W80-05800, OWRT-A-004-VI(1)
Contract DI-14-34-7100

Water use at a public restroom facility was substantially reduced after installation of low-flush toilets. Water in the region is scarce, demand is high, and water is expensive. The first year of operation of the low-flush toilets saved 36,500 gallons and reduced the true cost of water used at the facility, predominantly desalted water, from $757 to $210. The research demonstrated the practical value of a conservation technique that, if widely used in the Territory, could substantially reduce costs for government water and energy production.

PB80-199698 PC **A06**/MF **A01**
Wisconsin Univ.-Madison. Water Resources Center.
Regional Inferences Based on Water Quality Monitoring Data.
Technical rept.,
R. B. Miller, W. Bell, R. Y-Y. Wang, and O. Ferreiro. 1980, 113p WIS-WRC-80-05, W80-05797, OWRT-B-103-WIS(2)
Contract DI-14-34-0001-8053
Prepared in cooperation with Wisconsin Univ.-Madison. School of Business.

High-frequency temperature variations were measured at seven depths, from the water surface to 3 m, at a point 130 m from the cooling-water outfall of a power plant on Lake Michigan. The data are analyzed using spectra, correlation functions, and probability distributions. The sharp thermal fronts observed in the data are related to the surface thermal fronts seen using airborne infrared scanning, and to laboratory studies of instabilities in mixing layers between uniformly flowing and quiescent fluids.

PB80-200355 PC **A15**/MF **A01**
Aerospace Corp., El Segundo, CA.
Feasibility and Costs of Applying N0x Controls on Stationary Emission Sources in California.
Final rept.,
P. P. Leo, J. Rossoff, and J. R. Witz. May 80, 335p ATR-80(7806)-1, ARB-R-80-121
Contract ARB-A7-164-30

The feasibility and costs of various NOx control methods, i.e., ammonia-based catalytic and noncatalytic reduction systems and low NOx burners, were determined for potential application to selected stationary sources of nitrogen oxides (NOx) emissions in California, primarily in the Los Angeles area. The sources studied included: simple and combined cycle turbines used by electric utilities, an internal combustion engine used in compressing natural gas, an oil refinery process heater, an oil field steam generator used in thermally enhanced oil recovery, a cement kiln, and a glass melting furnace used in the manufacture of flat glass. Although the units selected were considered as representative either in terms of size, operation, or numbers in use, the results apply specifically to them. The criteria for NOx reduction, generally 90%, was specified by the staff of the Air Resources Board.

PB80-200363 PC **A04**/MF **A01**
Hittman Associates, Inc., Columbia, MD.
Analysis of Selected Samples for Metals Uptake.
Draft rept. (Final) Sep 78-Mar 79,
Lee Schultz. 13 Mar 79, 62p HIT-C0194/002-78-765D, EPA-600/7-80-098
Contract EPA-68-03-2664

Grass samples were collected from the Contrary Creek/D. Boyd Smith reclamation project of the Virginia Water Quality Control Board and the Anvil Points mine treatment experimental facility. Fish samples were collected from the EPA's mine water treatment experimental facility's sludge pond near Crown, West Virginia. Samples were analyzed for arsenic, boron, cadmium, chromium, copper fluorine, iron, mercury, lithium, manganese, molybdenum, nickel, phosphorus, lead, selenium, vanadium, and zinc. Various quality control procedures were applied and analyzed statistically in the report.

PB80-200496 PC **A18**/MF **A01**
Bechtel Corp., San Francisco, CA.
Field Evaluation of Advanced Methods of Subsurface Exploration for Transit Tunneling.
Final rept. Sep 78-Dec 79,
D. E. Thompson, J. T. Humphrey, L. W. Young Jr., and C. F. Wall. Jun 80, 405p DOT-TSC-UMTA-80-1, UMTA-MA-06-0100-80-1
Contract DOT-TSC-1570
Prepared in cooperation with Haley and Aldrich, Inc., Cambridge, MA.

This report presents the results of a field evaluation of advanced methods of subsurface exploration on an ongoing urban rapid transit tunneling project. The objective of this study is to evaluate, through a field demonstration project, the feasibility, applicability, reliability, and cost effectiveness of selected advanced methods of subsurface exploration and instrumentation to produce data usable for rapid transit tunnel design and construction within the time, cost, and schedule constraints common to the industry. Numerous methods of subsurface exploration, including hole advancement techniques, sampling procedures, and geophysical logging tools, were used to predict stratigraphy within a test section on an urban rapid transit project under construction. A test section on the Massachusetts Bay Transportaton Authority Red Line Extension-Northwest, Cambridge, Massachusetts, was selected to evaluate methods of subsurface exploration used to investigate stratigraphy, ground water levels, bedrock structure, and other geotechnical parameters. The site represents a typical urban setting with the test section located under a major, four-lane divided street, with structures adjacent on both sides.

PB80-200553 PC **A09**/MF **A01**
Geological Survey, Tallahassee, FL. Water Resources Div.
Chemical, Physical, and Radiological Quality of Selected Public Water Supplies in Florida, January-May 1979.
Water-resources investigations,
Bernard J. Franks, and G. A. Irwin. 1980, 191p USGS/WRD/WRI-80/028, USGS/WRI-80-13
Prepared in cooperation with Florida State Dept. of Environmental Regulation, Tallahassee. Bureau of Drinking Water and Special Programs. See also report for Nov 77-Feb 78 dated Apr 79, PB-300 829.

Most public water supplies sampled in Florida meet the National Interim Primary and Proposed Secondary Drinking Water Regulations. This conclusion is based on a water quality reconnaissance of 131 raw and treated public supplies throughout the State during the period January through May 1979. In a few public supplies, primary drinking water regulation maximum contaminant levels were exceeded for mercury, turbidity, and gross alpha particle activity. Secondary drinking water regulations were also occasionally exceeded in some public supplies for such parameters as chloride, pH, color, dissolved solids, iron, and manganese.

PB80-200561 PC **A09**/MF **A01**
Skelly and Loy, Harrisburg, PA.
Development of Methods to Improve Performance of Surface Mine Sediment Basins.
Rept. on phase I,
Charles E. Ettinger. Apr 80, 187p EPA-600/7-80-072
Contract EPA-68-03-2677

The control of erosion and sedimentation from disturbed lands is a subject of increasing interest, particularly in the area of surface mining. Because of the hydrologic conditions and steep terrain in Appalachia, a large share of the eroded material comes from surface mines, largely controlled through the use of sedimentation ponds. With the passage of the 1977 Clean Water Act which has a specific effluent limitation of total suspended solids from surface mine sedimentation basins, the Environmental Protection Agency has mandated that sediment basins be designed to achieve a specific effluent quality. Two methods for achieving this goal have been investigated during this study: physical modifications to sediment basin design parameters and the use of chemical coagulants. As a result of this study, methods have been determined for upgrading sediment pond efficiencies by physical modifications and coagulant usage.

PB80-200595 PC **A06**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ.
Guidelines for NOx Control by Combustion Modification for Coal-Fired Utility Boilers. Procedures for Reduction of NOx Emissions and Maximization of Boiler Efficiency.
Special rept. Jun 74-Dec 79,
E. H. Manny. May 80, 102p EE.116E.79, EPA-600/8-80-027

Contract EPA-68-02-1415

The report, which has been reviewed by industry experts, reflects the experience developed in successfully applying combustion modifications to reduce NOx emissions from coal-fired utility boilers. Although the report emphasizes coal-fired equipment, the same principles can be applied to gas- and oil-fired systems. Techniques, methods, and step-by-step procedures are detailed by example to guide utility personnel who may desire to conduct their own NOx emission reduction programs. Background information on operating parameters affecting NOx, necessary to understanding NOx emission control, is also included. Field studies were conducted from 1971 to 1979 to assess the feasibility of combustion modification to control NOx and other pollutants from large utility boilers. During these investigations, significant NOx reductions were demonstrated. For example, using a combination of staged combustion, low excess air firing, and other techniques reduced NOx by an average of 38%, over a range of 12 to 62%, in more than 35 utility boilers.

PB80-200819 PC **A06**/MF **A01**
A.P.T., Inc., San Diego, CA.
Particulate Control at High Temperature and Pressure Using Augmented Granular Bed Filters.
Final rept. Dec 78-Dec 79,
Shui-Chow Yung, R. G. Patterson, and Seymour Calvert. Feb 80, 106p EPA-600/7-80-035
Contract EPA-68-02-2183

The report gives results of experimental measurements (in fixed- and moving-bed filters) of the effect of electrostatic augmentation on granular bed filter particle collection efficiencies. Experimental findings included: (1) either polarizing the bed or charging the particles significantly increased the collection efficiency of the filter (efficiency increased with increasing applied voltage across the bed); (2) both polarizing the bed and charging the particles caused the bed to become very efficient in collecting particles (efficiency of a 15 cm deep bed of 1.6 mm diameter alumina spheres with a polarizing field strength of 1.31 kV/cm was above 98% for all particle sizes); (3) polarizing the bed and/or charging the particles has no effect on pressure drop across a clean bed; (4) a filter cake increases the collection efficiency of the granular bed filter (the increase depends on the cake structure and the amount of dust retained in the beds); (5) DC polarization is much more effective than low frequency AC polarization; and (6) fixed bed filters show a higher collection efficiency and a higher pressure drop than moving beds (in moving beds, lower recirculation rates also have lower rates of attrition of retaining grids and granules and lower rates of dislodging and reentraining the collected particles).

PB80-200843 PC **A03**/MF **A01**
TRW, Inc., Redondo Beach, CA.
Emissions of Reactive Volatile Organic Compounds from Utility Boilers.
Final rept. Aug 79-Apr 80,
Bernard Jackson, Lou Scinto, and Chris Shih.
May 80, 49p EPA-600/7-80-111
Contract EPA-68-02-3138

The report gives results of the measurement of emission factors for reactive volatile organic compounds (VOC) from 43 utility boilers firing bituminous coal, lignite, oil, and natural gas. The boilers ranged in size from 9 to 910 MW. The median reactive VOC emission factors were determined to be between 0.47 and 1.85 ng/J for coal- and lignite-fired sources (excluding stoker data); between 0.03 and 1.48 ng/J for residual-oil-fired sources; and between 0.01 and 1.00 ng/J for gas-fired sources. Approximately 50% of the coal- and lignite-fired plants and a majority of the oil- and gas-fired plants were emitting reactive VOC below the 100-ton per year level.

PB80-200892 PC **A02**/MF **A01**
New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.
Reduction of Reflection Cracking in Bituminous Overlays on Rigid Pavements.
Interim rept. no. 2,
James E. Noonan, and Frank R. McCullagh. Jun 80, 23p NYSDOT-ERD-80-RR-80, FHWA/NY/RR-80/80

This report describes attempts to control reflection cracking in bituminous overlays on rigid pavements. Three methods are discussed -- breaking the rigid pavement before overlaying, sawing joints in the overlay over those in the rigid pavement, and placing fiber-mesh mats over rigid pavement joints and cracks to dissipate local stress through the overlay. The results indicate that broken pavement and sawed joints are generally successful, but that mesh mats do very little to control reflection cracking. The feasibility and effectiveness of the three methods are compared.

PB80-200959 PC **A04**/MF **A01**
Cullen Coll. of Engineering, Houston, TX.
Cooling Water Recycle by Softening.
Final rept. 1 May 77-1 Nov 79,
Jack V. Matson. 1979, 60p NSF/RA-790434
Grant NSF-ENV77-06504

Development of a preliminary design methodology for integrating a sidestream softening unit into a cooling water system to achieve zero pollutant discharge is presented. Cooling water discharge is a major environmental problem which the U.S. Environmental Protection Agency (EPA) and Congress aim to eliminate from all industrial facilities within the decade. Current zero blowdown technologies involve sidestream softening (using lime-soda, reverse osmosis, ion exchange and electrodialysis) in which a side-stream of water from the cooling tower is treated to remove potential scale-forming and corrosive material bringing scaling and corrosion to acceptable levels. Basics of softening and scaling related to the adsorption of silica and the kinetics of high total dissolved solids (TDS) reactions involving calcium, magnesium, and silica are investigated.

PB80-200975 PC **A12**/MF **A01**
Nebraska Univ.-Lincoln. Center for Agricultural Meteorology and Climatology.
Research in Great Plains Drought Management Strategies, Proceedings of the Workshop Held in Lincoln, Nebraska on March 26-28, 1979,
Norman J. Rosenberg, Richard O. Hoffman, M.-L. Quinn, and Donald A. Wilhite. Feb 80, 256p
CAMAC/PUB-80-3, NSF/RA-800068
Grant NSF-OPA77-21289

The findings of four task groups are reported. Topics were technology; economics; politics and decision-making problems; and social and informational problems. Current knowledge of past and present effects of Great Plains drought was reviewed in each of the task groups and major areas where knowledge is lacking were identified and reported. The future vulnerability of the Great Plains region to drought was assessed. All task groups recognized the inevitability and the climatic normality of drought in the Great Plains region. It was generally agreed that physical vulnerability of the land is now increasing because of excessive use of fossil water and because of inappropriate land use in marginal areas. The economic (and therefore, political and social) vulnerability will likely increase since the Great Plains region's intensive agriculture, already strained by extreme and rapid increases in the costs of energy, can be shocked even more in times of drought.

PB80-201320 PC **A03**/MF **A01**
New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.
Performance of Preformed Compression Sealers in Transverse Pavement Joints.
Final rept.,
James E. Bryden, and Ronald A. Lorini. Mar 80, 48p FHWA/NY/RR-80/76

Preformed compression sealers, 1-1/4-in. wide and installed in 5/8-in. wide transverse contraction joints in rigid pavements, were observed for up to 10 years. Construction operations were monitored, and laboratory tests conducted to determine sealer properties. Some fine material infiltrated below the sealer after 6 to 10 years in service, but most sealers generally performed well for that period. Many joints closed tighter than the 5/8-in. minimum design width. Although the narrow joints resulted in more compression set in the sealers, they had less infiltration and spalling than the wider ones. For larger sizes of preformed sealers, such as were included in this study, compression to 40 percent of original width appears to improve joint sealing. Results of force-deflection and recovery tests performed on new sealer samples related to compression set occurring during field service, but not to infiltration. Force-deflection and recovery properties of the sealers generally decreased after field aging, but these decreases did not relate to sealer performance. Preconditioning sealer samples at elevated (212 F) or reduced (14 and -20 F) temperatures produced changes in force-deflection and recovery properties, but those changes did not relate to field performance or to changes in the same properties during field aging. A laboratory cycle test, which simulates joint infiltration, appeared to relate to field infiltration.

PB80-201387 PC **A15**/MF **A01**
Klamath Falls, OR.
Economic Adjustment Strategy, Kingsley Field - Partial Utility Survey, City of Klamath Falls, Oregon.
May 80, 328p
Grant EDA-07-09-02285
Prepared in cooperation with Meyer (Robert E.), Beaverton, OR.

The City of Klamath Falls was charged with developing a comprehensive economic adjustment program to address an actual or threatened economic dislocation brought about by the realignment of the mission of the U.S. Air Force at Kingsley Field Air Base, Klamath Falls, Oregon. The Partial Utility Survey is being accomplished to assist the City during their takeover of facilities at Kingsley Field and to provide direction in terms of utility system loadings under the long term base reuse scheme.

PB80-201411 PC **A12**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters. Section V (Volume 6) - Neutral Point Analysis Output: Quasi-Theoretical Thrusts and Shears, with Experimental Thrusts.
Interim rept.,
R. E. Davis, F. M. Semans, D. W. Spannagel, and A. E. Bacher. Feb 79, 265p FHWA/CA/SD-79/08
See also Volume 5, Section 5, PB80-183304.Color illustrations reproduced in black and white.

The neutral point analysis described in SECTION V (Volume 1) was employed to determine quasi-theoretical thrusts and shears in the walls of the Cross Canyon, reinforced concrete culvert, using normal and tangential tractions modified to satisfy equilibrium considerations. Experimental values of thrust, determined from internal strain gauges, are included for comparison.

PB80-201437 PC **A07**/MF **A01**
Argonne National Lab., IL. Energy and Environmental Systems Div.
ANL(Argonne National Laboratory)/HIWAY: An Air Pollution Evaluation Model for Roadways, Environmental Pollutants and the Urban Economy,
George A. Concaildi, Alan S. Cohen, and Richard F. King. 1976, 143p NSF/RA-761294
Grants NSF-AG-352, NSF-GI-32989
Prepared in cooperation with Chicago Univ., IL. Center for Urban Studies.

This report describes ANL (Argonne National Laboratory)/HIWAY, a computer program for calculating air quality levels of nonreactive pollutants produced by vehicles. It is valid for receptors at distances of tens to hundreds of meters, at any angle, downwind of the highway, in relatively uncomplicated terrain. It may be used by planners to analyze the effects of a proposed roadway on adjacent air quality, e.g., effects to be incorporated into an environmental impact statement as required by the National Environmental Protection Policy Act of 1969 for a federally funded highway construction project. The ANL/HIWAY program is a driver for the line source subroutine NCEPA (a modified EPA subroutine), providing it with flexible input, output, and other options. NCEPA performs the actual line source integration. The program (ANL/HIWAY) is written in Fortran. Its variables, arrays, and complete program listing are presented together with sample problems and solutions. The ANL/HIWAY model expands the evaluation capabilities of the EPA/HIWAY dispersion model. This

report also serves as a user's manual for running the ANL/HIWAY program. All command structures are described in detail.

PB80-201478 PC **A10**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Soil Water Properties of Subgrade Soils.
Civil engineering studies (Final) 1 Jul 77-31 Dec 79,
Donald J. Janssen, and Barry J. Dempsey. Apr 80, 219p UILU-ENG-80-2010,
TRANSPORTATION ENGINEERING SER-27, FHWA/IL/UI-184

The soil-water characteristic data and hydraulic conductivity data were determined for 24 soil series in Illinois. Laboratory testing procedures for determining the saturated hydraulic conductivity and soil-water characteristic data were described in detail. Matric suction was determined by use of Tempe pressure cells at low pressures and a pressure plate apparatus at the higher pressures. The influence of soil type on matric suction and hydraulic conductivity was discussed. It was shown that subgrade soil strength can be predicted based on knowledge of the equilibrium water content determined from the soil-water characteristic relationship and field boundary conditions.

PB80-201510 MF **A01**
Clemson Univ., SC. Dept. of Civil Engineering.
Drainage Manual for the South Carolina Department of Highways and Public Transportation. Volume I. Theory Manual.
Final rept.,
Albert G. Law. Aug 78, 250p FHWA-SC-78-527(1)
See also Volume 2, PB80-201528. Sponsored in part by South Carolina Dept. of Highways and Public Transportation, Columbia.
Available microfiche only because of poor quality.

This two-volume drainage manual reflects current hydrological design conditions in South Carolina. Volume I (Theory manual) includes discussion of concepts and computer programs that are available to engineers who design drainage structures. Attention is given to phenomena that influence the hydraulics of culverts and bridges and a section has been devoted to design problems associated with longitudinal drainage. Sediment-erosion problems and methods of debris control are discussed.

PB80-201528 PC **A15**/MF **A01**
Clemson Univ., SC. Dept. of Civil Engineering.
Drainage Manual for the South Carolina Department of Highways and Public Transportation. Volume II. Design Manual.
Final rept.,
Albert G. Law. Aug 78, 337p FHWA-SC-78-257(2)
See also Volume 1, PB80-201510. Sponsored in part by South Carolina Dept. of Highways and Public Transportation, Columbia.

This two-volume drainage manual reflects current hydrological design conditions in South Carolina. Volume II (design manual) is written to guide design engineers who are already familiar with the concepts of hydrology and hydraulics. Early chapters deal with the policy, procedures and field survey techniques that form the foundation of most designs. Chapters 4, 5, and 6 cover the design of culverts, bridges and longitudinal drainage. Design examples are interspersed in the text. Analytical and numerical solutions are given. The final chapter provides information for basic erosion control in designs. The design procedures are easy to follow and require a minimum of supplementary material.

PB80-201627 PC **A03**/MF **A01**
Texas State Dept. of Highways and Public Transportation, Austin.
Improved Stripe Removal by High Temperature Burning with Excess Oxygen: Design, Operation and Maintenance Manual,
Don Killgore. Jan 80, 34p 1-9-78-511, FHWA-IP-80-6
Contract DOT-FH-11-8608

High-temperature burning with excess oxygen has proved to be a pavement marking removal system which allows a rapid flash burning of pavement markings with minimal motorist recognition and little or no pavement surface deterioration. This pavement marking removal system, however, does leave the burned residue (of the pavement marking) on the roadway surface. This document discusses the design, operational, and safety requirements for high-temperature burning and residue removal procedures.

PB80-201643 PC **A10**/MF **A01**
Lehigh Univ., Bethlehem, PA. Fritz Engineering Lab.
Live Load Distribution in Skewed Prestressed Concrete I-Beam and Spread Box-Beam Bridges.
Interim rept.,
Ernesto S. deCastro, Celal N. Kostem, Dennis R. Mertz, and David A. VanHorn. Aug 79, 223p FEL-387.3, FHWA-PA-RD-72-4-3
Prepared in cooperation with Pennsylvania Dept. of Transportation, Harrisburg.

The effects of skew on the design moments and on the lateral distributions of statically applied vehicular loads are examined for prestressed concrete I-beam and prestressed concrete spread box-beam bridge superstructures. The finite element method is utilized to analyze 120 I-beam superstructures and 72 box-beam superstructures ranging in length from 34 ft. to 128 ft. and in roadway width from 24 ft. to 72 ft. Skew effects are correlated for bridges of different widths, span lengths, number of beams, and number of design lanes, and empirical expressions are developed to facilitate computation of lateral load distribution factors for interior and exterior beams. The proposed skew distribution factors are actually based upon appropriate modifications to the distribution factors for right bridges. In general, the skew correction factor reduces the distribution factor for interior beams and increases the distribution factor for exterior beams. The magnitude of the skew effect is primarily a function of skew angle and of bridge span and beam spacing.

PB80-201726 PC **A04**/MF **A01**
Texas Univ. at Austin, Port Aransas. Port Aransas Marine Lab.
Environmental Studies, South Texas Outer Continental Shelf, Chemistry and Biology. Executive Summary.
Final rept. for 1976.
30 Sep 77, 71p BLM/YM/ES-77/1-ES
Contract DI-AA550-CT6-17
See also Volume 1, PB-292 346.

Results of the second year (1976) of biological, chemical, physical and geological investigations of the South Texas Outer Continental Shelf are reported on. The objective of these investigations was to begin assessing the impacts of petroleum exploration and development and to expand the baseling effort to gain additional environmental information beyond that collected in the first year.

PB80-201742 PC **A99**/MF **A01**
Bureau of Land Management, Los Angeles, CA. Pacific Outer Continental Shelf Office.
Proposed 1979 Outer Continental Shelf Oil and Gas Lease Sale Offshore Southern California. OCS Sale No. 48.
Final environmental statement.
Jan 79, 732p BLM/YN/ES-79-01
See also Volume 2, PB80-201759.

The Environmental Statement considered all available data and evaluated potential effects of the proposed sale which might occur during exploration, development, and production of mineral resources. The following topics were specifically addressed: Description of the proposed action; Description of the environment; Environmental impacts of the proposed action; Mitigating measures not included in the proposed action; Unavoidable adverse environmental effects; Relationship between local and short-term uses of man's environment and maintenance and enhancement of long-term productivity; Irreversible and irretrievable commitment of resources; Alternatives to the proposed action; Consultation and coordination.

PB80-201759 PC **A99**/MF **A01**
Bureau of Land Management, Los Angeles, CA. Pacific Outer Continental Shelf Office.
Proposed 1979 Outer Continental Shelf Oil and Gas Lease Sale Offshore Southern California. OCS Sale No. 48. Volume 2.
Final environmental statement.
Jan 79, 653p BLM/YN/ES-79-02
See also Volume 3, PB80-201767.

Final Environmental Statement (FES), Sale No. 48, covered the Outer Continental Shelf (OCS) oil and gas lease sale area offshore Southern California. The Environmental Statement considered available data and evaluated potential effects of the proposed sale which might occur during exploration, development, and production of mineral resources.

PB80-201767 PC **A99**/MF **A01**
Bureau of Land Management, Los Angeles, CA. Pacific Outer Continental Shelf Office.
Proposed 1979 Outer Continental Shelf Oil and Gas Lease Sale Offshore Southern California. Volume 3. OCS Sale No. 48.
Final environmental statement.
Jan 79, 728p BLM/YN/ES-79/03
See also Volume 1, PB80-201742.

Final Environmental Statement (FES), Sale No. 48, covered the Outer Continental Shelf (OCS) oil and gas lease sale area offshore Southern California. The Environmental Statement considered available data and evaluated potential effects of the proposed sale which might occur during exploration, development, and production of mineral resources.

PB80-201890 PC **A16**/MF **A01**
Utah Water Research Lab., Logan.
Wastewater Stabilization Lagoon, Intermittent Sand Filter Systems.
Final rept. Oct 76-Jul 79,
J. S. Russell, E. J. Middlebrooks, and J. H. Reynolds. Mar 80, 353p EPA-600/2-80-032
Grant EPA-R-804592

The performance of three prototype lagoon-intermittent sand filtration systems were evaluated for three 30 consecutive day periods during different seasons throughout a sixteen month period. Twenty-four different parameters were monitored on 24-hour composite samples. Design criteria, operation and maintenance procedures, and costs were collected and evaluated for each system.

PB80-201908 PC **A03**/MF **A01**
Geological Survey, University, AL. Water Resources Div.
Effect of Surface Coal Mining on the Hydrology of Crooked and Turkey Creek Basins, Jefferson County, Alabama.
Water-resources investigations (Interim),
Celso Puente, and J. G. Newton. Aug 79, 48p USGS/WRI-79-91, USGS/WRD/WRI-80/031

Streamflow, sediment yield, and water quality were monitored from October 1975 through May 1977 to determine the impact of surface coal mining on the hydrology of Crooked and Turkey Creek basins in Jefferson County, Alabama.

PB80-202005 PC **A07**/MF **A01**
Arizona Univ., Tucson. Dept. of Hydrology and Water Resources.
Guidelines: The Use of Cultural Resource Information in Water Resource Environmental Impact Reports.
Master's thesis,
Dale Alan Altshul. 1980, 145p W80-05807, OWRT-A-088-ARIZ(1)

Techniques and guidelines for use by public officials when conducting cultural resource analysis on federally funded water projects were developed. The more important Acts and Executive Orders which deal directly with cultural resources and environmental impact analysis are summarized in the report.

PB80-202187 PC **A07**/MF **A01**
Department of Transportation, Washington, DC. Research and Special Programs Administration.
Catastrophe Theory in Urban and Transport Analysis: Eight Papers,
Dimitrios S. Dendrinos. 15 Jun 80, 149p DOT/RSPA/DPB-25/80/20

Eight papers are included in this volume, which is divided into four parts: Part I contains two papers of a survey nature where an overview of the applicability of catastrophe theory and bifurcation theory in the area of urban analysis is provided. The notion that cities behave as different population species competing for resources is laid out and the basic population dynamics aspect of it is provided. Part II contains two papers extensions of a seminal paper by C. Zeeman on the heartbeat and nerve impulse problem, as applied in method to the problem of aggregate urban evolution. Issues of oscillatory behavior and predator-prey ecology in city dynamics within a national economy are examined. Part III consists of three papers dealing with dynamic individual mode choice behavior using catastrophe theory. Elaborating on a new model by Y. Zahavi critical thresholds are arrived at where sudden changes in distances traveled by different modes result as continuous changes are recorded in transport costs. Finally, the last Part contains a paper discussing the relationship between multiple internal rate of return solutions in investment projects and catastrophe theory.

PB80-202229 PC **A10**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Monitoring and Data Analysis Div.
Procedures for the Preparation of Emission Inventories for Volatile Organic Compounds. Volume II: Emission Inventory Requirements for Photochemical Air Quality Simulation Models.
Sep 79, 221p EPA-450/4-79-018
See also Volume 1, PB-275 292.

This is a companion document to Volume I, which describes procedures for compiling the annual countywide inventory of volatile organic compound (VOC) emissions. Volume II describes procedures for converting the annual countywide emission inventory to the detailed inventory needed for photochemical models. The detailed inventory contains hourly gridded emissions (by species class for VOC and NOx) for a typical weekday during the oxidant season.

PB80-202252 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Recommended Technical Provisions for Construction Practice in Shoring and Sloping of Trenches and Excavations.
Building science series (Final),
Felix Y. Yokel. Jun 80, 90p NBS-BSS-127
Sponsored in part by National Inst. for Occupational Safety and Health, Rockville, MD., and Occupational Safety and Health Administration, Washington, DC. Library of Congress catalog card no. 80-600068.

On the basis of studies conducted by the National Bureau of Standards, technical provisions for the sloping and shoring of the banks of trenches and excavations are recommended. Included are a recommended standard practice for trenching which can be used by construction supervisors and compliance officers of the Occupational Safety and Health Administration, and proposed engineering guidelines for the design of shoring systems and other means to prevent mass movement of soil or rock in excavations.

PB80-202377 PC **A04**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC.
Impact of Natural Hydrocarbons on Air Quality,
Joseph J. Bufalini. May 80, 70p EPA-600/2-80-086

The emissions, reactivities, and ozone-forming potential of natural hydrocarbons are discussed. A review of the data available on emission levels for natural hydrocarbons indicates that much more information is needed in order to quantify the absolute emission levels, because emissions data do not agree with ambient air measurements. These ambient air measurements suggest that the previous published value of 9 x 10 to the 8th power ton/yr needs to be lowered to 10 to the 6th power - 10 to the 7th power ton/yr. Emissions may be overpredicted by a factor of 15 to 20, as indicated by back calculations using a simple diffusion trajectory model. Isoprene, when compared to the monoterpenes, is much more efficient in producing ozone through photoxidation in the presence of NOx. This greater ozone production apparently occurs because of the large amount of carbon consumed in the formation of aerosols for the monoterpenes. Since rural areas have very low levels of NOx, vegetative emissions may in fact act as sinks for ozone rather than as sources. All areas investigated show very low levels of natural hydrocarbons, suggesting that even if NOx were available, very low levels of ozone would be produced. Air quality is thus not found to be significantly affected by vegetative emissions.

PB80-202385 PC **A04**/MF **A01**
American Electroplaters' Society, Inc., Winter Park, FL.
Evaluation of Reverse Osmosis Membranes for Treatment of Electroplating Rinsewater.
Final rept. 1 May 76-19 Oct 77,
Kenneth J. McNulty, and Peter R. Hoover. May 80, 54p EPA-600/2-80-084
Grant EPA-R-804311
Prepared in cooperation with Abcor, Inc., Wilmington, MA. Walden Div.

Because of the limited pH range over which current commercially available reverse osmosis membranes can be applied, a test program was initiated to define the applicability of new membrane materials to the treatment of rinsewaters with extreme pH levels and high oxidant levels (chromic acid). Life tests were conducted with the PA-300, PBIL, NS-100, NS-200, SPPO, B-9, and CA membranes on rinsewaters from copper cyanide, zinc cyanide, acid copper, and chromic acid plating baths. The PA-300 membrane exhibited superior performance for the treatment of copper cyanide, zinc cyanide, and chromic acid rinsewaters, and further development and demonstration of this membrane is recommended.

PB80-202682 PC **A04**/MF **A01**
National Transportation Policy Study Commission, Washington, DC.
Mechanisms for Policy Development and Acceptance.
Working paper.
Jan 79, 61p NTPSC/WP-79-25

The paper describes the approach used by NTPSC staff to formulate policy recommendations. This approach is compared with methods used in previous transportation policy studies and other approaches suggested by NTPSC staff. The selective and sometimes biased modal orientation of preceding studies is set in contrast with the NTPSC's approach based on the urban, rural, intercity, and international markets for passenger and freight. Further, the contrast between the frequently historical orientation of other studies and the emphasis on the future by NTPSC is noted. Additional concerns other than strict economic efficiency--concerns such as energy, safety, and the environment--are formulated in a values package that is new to the discussion of transportation. The role of the three basic policy categories applied by the staff--Status Quo, Net Benefits, and Values--is presented, and the NTPSC's process of impact analysis is also described.

PB80-202781 PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Source Category Survey: Mineral Wool Manufacturing Industry.
Final rept.
Jun 80, 97p EPA-450/3-80-016

This report contains background information which was used for determining the need for new source performance standards (NSPS) for the mineral wool manufacturing industry in accordance with Section 111 of the Clean Air Act. Air pollution emissions and growth trends of the mineral wool industry are examined. Manufacturing processes, control strategies, and state and local air pollution regulations are discussed. The impact of a potential NSPS on particulate and carbon monoxide emissions is calculated.

PB80-202831 PC **A99**/MF **A01**
Environment Consultants, Inc., Dallas, TX.
Environmental and Socio-Economic Baseline on the Gulf of Mexico Coastal Zone and Outer Continental Shelf. Volume I. Supplemental Bibliography on Environmental Processes and Conditions in the Gulf of Mexico Region.
Final rept.
1974, 765p BLM/YM/ES-74/1
Contract DI-08550-CT3-10
See also Volume 2, PB80-202849.
Also available in set of 3 reports PC E99, PB80-202823.

Volume I is an upgraded and updated annotated bibliography on environmental processes and conditions in the Gulf of Mexico. This bibliography has been compiled through a literature search. Its purpose is to provide the reader with a reasonably comprehensive review of the published literature in the subjects considered of relevance to a study of the Gulf of Mexico, the U.S. Gulf Coastal Region and the Outer Continental Shelf.

PB80-202849 PC **A23**/MF **A01**
Environment Consultants, Inc., Dallas, TX.
Environmental and Socio-Economic Baseline on the Gulf of Mexico Coastal Zone and Outer Continental Shelf. Volume II. Current and Recent Research on Environment Processes and Conditions in the Gulf of Mexico Region.
Final rept.
1974, 532p BLM/YM/ES-74/2
Contract DI-08550-CT3-10
See also Volume 1, PB80-202831, and Volume 3, PB80-202856.
Also available in set of 3 reports PC E99, PB80-202823.

Volume II is a compilation of recent and current research in progress concerning the Gulf of Mexico. Information provided herein enables researchers to locate very recent resources in various fields of study with relevance to the Gulf Coastal Region. The research subjects included were selected because of their probable relevance to environmental assessment with respect to oil exploration and development activities in the Gulf coastal region.

PB80-202856 PC **A15**/MF **A01**
Environment Consultants, Inc., Dallas, TX.
Environmental and Socio-Economic Baseline on the Gulf of Mexico Coastal Zone and Outer Continental Shelf. Volume III. Socio-Economic Inventory and Analysis of the Gulf of Mexico Region.
Final rept.
1974, 340p BLM/YM/ES-74/3
Contract DI-08550-CT3-10
See also Volume 2, PB80-202849.
Also available in set of 3 reports PC E99, PB80-202823.

Volume III is a socio-economic inventory and analysis of the study area, prepared in order to provide both detailed and comprehensive data on social and economic factors as they relate to the environmental processes and resources of the Gulf of Mexico. Many of these factors are presented in five-color distribution maps. It is expected that impact evaluations of resource development projects in this region may be more easily facilitated by information in Volume I and II.

PB80-202906 PC **A04**/MF **A01**
PEDCo-Environmental, Inc, Cincinnati, OH.
Design Considerations for Minimizing Operation and Maintenance Problems of Particulate Control Equipment.
Mar 80, 52p EPA-905/2-80-002
Contract EPA-68-02-2535

This report addresses various operation and maintenance problems frequently associated with three types of air pollution control equipment: electrostatic precipitators, scrubbers, and fabric filters. The report discusses instrumentation, materials of construction, and design considerations in particulate control equipment that improve performance. Such improvements include reduction or prevention of malfunction, early detection of malfunction, and easier maintenance and operation of equipment. Because some problems can never be completely eliminated, methods of reducing downtime are also addressed.

PB80-202930 PC **A04**/MF **A01**
New Mexico Water Resources Research Inst., Las Cruces.
Water Treatment for Small Public Supplies. Operation Data - 1979, San Jon and Alamogordo.
Technical rept.,
Harry G. Folster, Donald B. Wilson, Steven Hanson, and Raymond Duran. Feb 80, 62p
WRRI-119, W80-06007, OWRT/T-0009(7515)(3)
See also report dated May 78, PB-285 963.

Reverse osmosis and electrodialysis water treatment techniques were applied to saline water in San Jon and Alamogordo, New Mexico. Laboratory studies of selective cation removal by precipitation to remove trace heavy metals in water supplies were continued. The mobil van unit containing the water treatment equipment was moved from San Jon to Alamogordo. Electrodialysis of water at San Jon reduced the salinity from 1000 ppm to 87 ppm, and reverse osmosis decreased the conductivity from 1300 to 220 (SW, spiral wound nodule)/ 30 (HFF, hollow fine fiber). Water recovery after the treatment processes ranged from 78 to 85%. Desalting at Alamogordo reduced the salinity from about 1300 ppm to about 78 ppm and reverse osmosis reduced the conductivity from about 1880 to 130 (SW)/120 (HFF). Sulfide precipitation of heavy metal cations (cadmium, mercury, and zinc) was performed on the water samples and analysis of variance of F-tests were carried out for each set of rate data.

PB80-202997 PC **A14**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Electric Arc Furnaces in Ferrous Foundries - Background Information for Proposed Standards.
May 80, 306p EPA-450/3-80-020a
Contract EPA-68-02-3059

Standards of Performance for the control of emissions from electric arc furnaces in ferrous foundries are being proposed under the authority of Section 111 of the Clean Air Act. These standards would only apply during periods of melting and refining in the furnace. This document contains background information and environmental and economic impact assessments of the regulatory alternatives considered in developing proposed standards.

PB80-203136 PC **A02**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC. Emissions Measurement and Characterization Div.
Passenger Car Hydrocarbon Emissions Speciation.
Final rept.,
Frank Black, and Larry High. May 80, 25p EPA-600/2-80-085

Emission factors for over 60 individual hydrocarbon compounds were determined for four passenger cars. The cars included a 1963 Chevrolet, a 1977 Mustang, and 1978 Monarch, and 1979 LTD II. The speciation data is reported for both tailpipe and evaporative emissions. The tailpipe emissions were for the urban driving conditions of the Federal Test Procedure used in motor vehicle certification. The evaporative emissions were for both diurnal and hot soak conditions, also prescribed in the Federal Test Procedure for certification. The vehicle tests involved four gasoline fuels of varying composition.

PB80-203193 PC **A03**/MF **A01**
General Electric Co., Santa Barbara, CA. Center for Advanced Studies.
Groundwater Quality Monitoring of Western Coal Strip Mining: Preliminary Designs for Reclaimed Mine Sources of Pollution,
Lorne G. Everett, and Edward W. Hoylman. Jun 80, 50p GE79TMP-43, EPA-600/7-80-109
Contract EPA-68-03-2449

This report is the fourth in a series of studies to assess the impact on groundwater quality of coal strip mining in the western United States. Presented are preliminary groundwater monitoring design guidelines for reclaimed mine areas, including regarded spoils and reclamation aids. The study area for this report is Campbell County, Wyoming, which overlies one of the major coal fields in the Powder River Basin.

PB80-203227 PC **A06**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Control of Copper Smelter Fugitive Emissions.
Final rept. Mar 76-Oct 79,
Timothy W. Devitt. May 80, 115p EPA-600/2-80-079
Contract EPA-68-02-2535

This report deals with fugitive emissions from copper smelting and with related emission control measures. The study involved evaluation of the controls now used in the copper smelting industry and development of suggestions for alternative control devices and practices. A brief overview of copper smelting processes is followed by a more detailed analysis of the conventional processes identifying portions of the operating cycle that produce fugitive emissions. Emphasis is placed on Pierce-Smith Converting which is one of the major emission sources in copper smelting. Some alternate processes now in limited use in the U.S. are described including estimations of fugitive emissions from these conventional and alternative copper smelting processes. A specific report on the utilization of the Hoboken Converter is being prepared at the time of this report. The USEPA should be contacted if a copy of this report is desired.

PB80-203235 PC **A04**/MF **A01**
Council on Environmental Quality, Washington, DC.
A Case Study of the Use of EPA's STORET Water Quality File to Establish a U. S. Estuarine Water Quality Data Base,
Scott G. Leibowitz. 1979, 59p

This report is a case study of the use of data from the Environmental Progection Agency's (EPA) STORET Water Quality File to establish an estuarine water quality data base. The original project consisted of three tasks: to obtain nationwide estuary data from EPA's STORET system and transfer this to CEQ's UPGRADE computer software system; to submit a draft report on the availability of estuarine data and problems encountered while establishing the data base; and to submit a draft report on conditions and trends in U.S. estuarine water quality, based on UPGRADE analyses of the data.

PB80-203359 PC **A07**/MF **A01**
Technology Service Corp., Santa Monica, CA.
Analysis of the St. Louis RAMS (Regional Air Monitoring System) Ambient Particulate Data. Volume I: Final Report,
John Trijonis, John Eldon, John Gins, and George Berglund. Feb 80, 142p EPA-450/4-80-006A
See also Volume 2, PB80-203367.

In this report, a variety of data analysis methods are used to study the 1976 particulate data from the Regional Air Monitoring System (RAMS) in St. Louis. The aerosol data, collected at ten sites, include hi-vol measurements of total suspended particulate mass (TSP), as well as dichotomous sampler measurements of inhalable particulate mass (IP). IP is subdivided into fine particles (less than 2.4 micrometers in diameter) and coarse particles (between 2.4 and 20 micrometers in diameter). This study also includes dichotomous sampler data for eight trace elements (S, Si, Al, Ca, Pb, V, Ti, and Fe) and data for 11 meteorological parameters. The analyses characterize the spatial pattern of particulate matter in-and-near St. Louis; background aerosol concentrations and particulate transport; temporal patterns of particulate concentrations, the dependence of aerosol concentrations on meteorology; and the relationship between hi-vol data and dichotomous data. Averaged over the RAMS network, IP mass consists of 50% fine particles and 50% coarse particles. Sulfates, secondary aerosols occurring on a large (air basin and synoptic) scale, constitute 53% of fine mass and 29% of IP. Crustal material, mostly consisting of manmade fugitive dust, comprises 83% of coarse mass and 47% of IP. That sulfate is the major source of fine mass and that crustal material dominates coarse mass are the two major themes apparent in the spatial, temporal, and meteorological patterns of the dichotomous data.

PB80-203367 PC **A06**/MF **A01**
Technology Service Corp., Santa Monica, CA.
Analysis of the St. Louis RAMS (Regional Air Monitoring System) Ambient Particulate Data. Volume II: Technical Appendices,
John Trijonis, John Eldon, John Gins, and George Berglund. Feb 80, 115p EPA-450/4-80-006B
See also Volume 1, PB80-203359.

Contents:
- 1976 annual and monthly statistics for particulate and meteorological data;
- Maps of particulate elemental concentrations;
- Tables relating particulate element concentrations to site characteristics;
- Tables of interstation correlations;
- Methodology for the regional upwind/downwind analysis;
- Detailed data on hebdomadal and diurnal patterns at sites 103 and 105, organized quarterly and annually;
- Weekend-weekday differences of twelve particulate parameters at the ten RAMS sites;
- Decision-trees relating fine and IP to elemental concentrations;
- Decision-trees relating TSP, IP, fine, coarse, and eight elemental concentrations to meteorological variables;
- Decision-trees relating IP/TSP ratio to elemental concentrations and meteorology.

PB80-203425 PC **A10**/MF **A01**
York Research Corp., Stamford, CT.
Impact of a Primary Sulfate Emission Source on Air Quality.
Final rept.,
K. R. Boldt, C. P. Chang, E. J. Kaplin, J. M. Stansfield, and B. R. Wuebber. May 80, 218p EPA-600/2-80-109
Contract EPA-68-02-2965

A one-month study was carried out at an isolated oil-fired power plant in New York State to assess the impact of primary sulfate emissions on air quality. Emissions of total sulfate from the source varied from 22 kg/hr to 82 kg/hr per boiler with the sulfuric acid concentration averaging 74% of the total sulfate. Particulate emissions ranged from 12 kg/hr to 70 kg/hr per boiler with between 32% and 67% of the particle mass as water soluble sulfate. Vanadium was implicated as the driving force in the magnitude of the primary sulfate emissions. Measurements taken 5 km downwind of the plant indicated a source sulfate contribution of from 30% to 60% of the 24 hr average ambient levels.

PB80-203466 PC **A09**/MF **A01**
Arkansas Water Resources Research Center, Fayetteville.
Chemistry of the Spring Waters of the Ouachita Mountains Excluding Hot Springs, Arkansas.
Project completion rept. 1 Oct 77-30 Sep 79,
George H. Wagner, and Kenneth F. Steele. Mar 80, 182p PUB-89, W80-06010, OWRT-B-055-ARK(1)
Contract DI-14-34-0001-8061

Chemical analysis of the waters from 93 springs and 9 wells in the Ouachita Mountains (excluding Hot Springs), Arkansas, are reported. The study was carried out to investigate groundwater quality, its subsurface temperature, and its potential as a mineral pathfinder. The samples were collected and stored in clean polyethylene containers for SiO_2, SO_4, Cl, PO_4, and NH_3 analyses. Alkalinity, pH, temperature, and conductivity were measured at the site and raw water was filtered to remove any solid contaminants. Atomic absorption (AA), spectrophotometry, or flame emission were employed in the analyses of all cations in the acidified raw water. Springs with anomalously high temperatures, metal content, and high silica content, are likely to indicate known, local mineralization.

PB80-203524 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Quantitation of Pollutants in Suspended Matter and Water from Puget Sound.
Technical memo.,
Robert G. Riley, Eric A. Crecelius, Dale C. Mann, Keith H. Abel, and Berta L. Thomas. Apr 80, 110p NOAA-TM-ERL-MESA-49, NOAA-80061003

Puget Sound waters contained suspended matter uncontaminated by metals except for Elliott and Commencement Bays. Five metals (arsenic (As), copper (Cu), lead (Pb), antimony (Sb) and zinc (Zn)) were elevated in suspended matter collected at stations in Elliott and Commencement Bays compared to control locations in Puget Sound and the Pacific Northwest. In addition, five or more of a list of nine aromatic hydrocarbons (naphthalene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benz(a)anthracene, chrysens, benzo(a)pyrene) were identified in suspended matter from each sampling site.

PB80-203557 PC **A03**/MF **A01**
Texas A and M Univ., College Station.
Water Treatment Project: Observations on Use of GAC in Practice.
Final rept. 23 Feb 79-31 Aug 79,
Tom D. Reynolds, and Scott J. Hawkins. May 80, 34p EPA-600/1-80-023
Grant EPA-C-2557-NAEX

The objectives of this project were: (1) to determine if granular activated carbon (GAC) adsorption beds applied in water treatment practice slough-off organic materials during the spring warm-up and (2) to evaluate the feasibility of the dilute or low-level COD procedure for the control of GAC beds in water treatment applications. Nine water treatment plants were studied for a period of five months during the spring of 1979.

PB80-203565 PC **A04**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Enforceability Aspects of RACT for Factory Surface Coating of Flat Wood Paneling.
Final rept.,
Catherine E. Jarvis, Cathie L. Gardinier, and Thomas C. Ponder, Jr. Apr 80, 68p EPA-340/1-80-005
Contract EPA-68-01-4747

Revised State Implementation Plans must include controls for emissions of volatile organic compounds (VOC's) from factory surface coating of flat wood paneling. This report identifies 57 coaters to which the VOC regulations apply. Methods currently used to control VOC emissions are: use of water-based coatings, use of ultraviolet-curable and electron-beam curable coatings, and incineration. Use of water-based coatings, the most widely applied method, is significantly reducing VOC emissions.

PB80-203680 PC **A04**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
An Assessment of the Adequacy of NHTSA's Motor Vehicle Safety Research Plan, Findings of a Workshop.
Final rept. Feb-Jun 79,
L. Segel, and K. Weber. Jun 79, 51p UM-HSRI-79-34, DOT-HS-805 440
Contract DOT-HS-9-02101

A workshop was held to evaluate the adequacy of the safety-related research and development activities planned in support of NHTSA's Five Year Plan for Motor Vehicle Safety and Fuel Economy Rulemaking. The document summarizes the deliberations and findings of that workshop.

PB80-203730 PC **A04**/MF **A01**
Performance Development Inst., Washington, DC.
Incentives for Technological Innovation in Air Pollution Reduction: An ETIP Policy Research Series. Volume 4: Analysis of the Rationale and Public Comment Regarding EPA's Proposed Regulation on Regional Consistency.
Final rept.,
Jay Evans, and William H. Foskett. May 80, 62p NBS-GCR-ETIP-80-89
Contract NBS-78-3603
See also Volume 1, PB80-187610.

This report focuses on the proposed regulation for regional consistency in administration of regulations under the Clean Air Act of 1977. The origin of this proposed regulation is described. The proposed regulation is analyzed into logical components which structure a descriptive analysis of its specific administrative provisions. Public comments on the advance notice and subsequent notice of proposed rulemaking are also reviewed and analyzed with reference to the administrative components of the proposed regulation. Copies of the public comments and other pertinent documentation are appended.

PB80-203748 PC **A03**/MF **A01**
Texas Transportation Inst., College Station.
Development of Preliminary Congestion Indices for Urban Freeways in Texas.
Interim rept. Sep 73-Jun 79,
Ronald W. Holder, Dennis L. Christiansen, and Charles A. Fuhs. Jun 79, 40p TTI-2-10-74-205-7, FHWA/TX-79/25-205-7
Report on Priority Use of Freeway Facilities.

Traffic congestion on urban freeways in Texas is a growing concern; freeways in each of the five largest cities in Texas experience some degree of congestion every weekday, yet no quantitative measure of freeway congestion has been developed. The report documents the results of an effort to develop a preliminary freeway congestion index. Elements of congestion are discussed, and measures of congestion which can be derived from available data are presented. Several candidate congestion indices are identified, and values for each are calculated and compared for nineteen selected freeways in five Texas cities. The study utilizes only readily available data; as a consequence, the results need to be viewed as preliminary, since data from a limited number of locations are used to describe an entire segment of roadway. Finally, recommendations are made of the best index to use for various applications.

PB80-203755 PC **A03**/MF **A01**
Maine Univ. at Orono. Social Science Research Inst.
An Evaluation of Signs for Sight-Restricted Rural Intersections.
Final rept. Jun 78-Sep 79,
Richard W. Lyles. Feb 80, 50p FHWA/RD-80/002
Contract DOT-FH-11-9401
Prepared in cooperation with Maine Dept. of Transportation, Bangor. Materials and Research Div.

The report reviews an experiment undertaken to examine the effectiveness of six signs and sign sequences for warning motorists of a hazardous or sight-restricted intersection ahead in a rural two-lane situation. Signs examined ranged from the standard intersection symbol warning sign (cross) to vehicle actuated signs with flashing warning lights. Data collected during the experiment included: speeds of motorists as they approached and passed through test intersections (sometimes with a vehicle stopped on the side road); vehicle classification and registration information; and, for selected sign/site combinations, survey information for some motorists regarding their recollection of and reaction to the tested signs. The principal findings were that emphatic type signs (warning sign with flashers or a regulatory sign) caused drivers to reduce their speed by about 5.0 kph (3 mph) more than standard warning signs, and to increase driver awareness (as measured by sign recall and noticing of a side road vehicle) by a factor of approximately two. Familiarity with a test site, type of vehicle being driven, and sex did not have a significant effect on drivers' reactions to the various sign/site conditions.

PB80-203763 PC **A03**/MF **A01**
Maine Univ. at Orono. Social Science Research Inst.
An Evaluation of Warning and Regulatory Signs for Curves on Rural Roads.
Final rept. Jun 78-Dec 79,
Richard W. Lyles. Mar 80, 42p FHWA/RD-80/009
Contract DOT-FH-11-9401
Prepared in cooperation with Maine Dept. of Transportaion, Bangor. Materials and Research Div.

The report reviews an experiment undertaken to examine the effectiveness of five sign treatments for controlling driver speeds in the vicinity of hazardous horizontal curves on rural two-lane highways. Signs examined ranged from the standard curve warning arrow to a regulatory speed zone sign in conjunction with a curve warning sign. Data collected during the experiment included both the following electronic and manual data: speeds of motorists as they approached and negotiated two horizontal curves, vehicle classification and registration information, and whether vehicles crossed over center and edge line markings. Data were collected under both day and night conditions and under adverse weather conditions. The principle findings were that no sign, or group of signs, were consistently more effective than another relative to decreasing the potential hazard at horizontal curves in rural two-lane situations. Because the report clearly shows that the experiment was well conceived, the reasons for the above results are not immediately clear. It may well be, however, that the proliferation of curve warning signs has lessened the average motorist's respect for the message they convey.

PB80-203870 PC **A11**/MF **A01**
Northern Michigan Univ., Marquette.
The Sediments of Presque Isle Harbor, Lake Superior.
Project completion rept.,
Donald L. Macalady. May 80, 227p W80-05832, OWRT-B-050-MICH(1)
Contract DI-14-34-0001-8091

Measurements by anodic stripping and atomic adsorption of cadmium, copper, lead and zinc in sediment core segments and overlying interfacial and interstitial waters in Presque Isle Harbor, Marquette, Michigan are reported. These data, plus water chemical parameters, particle size distribution, cation exchange capacity and total volatile solids are used to evaluate the nature of trace metals in the variable sandy sediments of the harbor. Results show metals mobilized generally away from the sediment-water interface in more highly disturbed areas with little mobilization in the less disturbed areas. The metals data plus a comparison series of analyses of surficial sediments for COD, TKN, oil and grease and total PO4(-3) indicate that the present classification of harbor sediments which has required on-land disposal of dredging spoils is not consistent with present contaminant levels.

PB80-204142 PC **A11**/MF **A01**
Urban Mass Transportation Administration, Washington, DC.
Innovation in Public Transportation: A Directory of Research, Development and Demonstration Projects.
Annual rept. 1 Oct 78-30 Sep 79.
1979, 245p UMTA/MA-06-0086-80-2
See also report dated 1978, PB80-130818.

This eighth annual directory contains descriptions of current research development and demonstration (RD&D) projects sponsored and funded by the urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation. The intent is to make public information regarding UMTA's RD&D activities. The directory focuses on activity that took place in fiscal year 1979. Programs relate mainly to technology development and deployment, service and methods demonstrations, transportation planning and management; other studies relate to local transportation (Technical Studies) and special planning studies; and programs of policy development and research (including University Research and Training Grant Program). The appendixes provide information about federal research and development in urban mass transportation grants and contracts. The document also provides an index of agencies/contractors, a project index, and a subject index.

PB80-204373 PC **A17**/MF **A01**
Versar, Inc., Springfield, VA.
Water-Related Environmental Fate of 129 Priority Pollutants. Volume I: Introduction and Technical Background, Metals and Inorganics, Pesticides and PCBs.
Final rept.,
Michael A. Callahan, Michael W. Slimak, Norman W. Gabel, Ira P. May, and Charles F. Fowler. Dec 79, 388p EPA-440/4-79-029A
Contract EPA-68-01-3852
Sponsored in part by Grant EPA-68-01-3867. Prepared in cooperation with SRI International, Menlo Park, CA. See also Volume 2, PB80-204381.

This report is a literature search and summary of relevant data for the individual fate processes (hy-

drolysis, biodegradation, photolysis, etc.) which might be expected to occur if a pollutant were introduced into an aquatic system. The report is organized into 101 individual chapters for pollutants or small groups of pollutants, and four introductory chapters. Each chapter has its own references so the chapters can be used independently. The approach taken by this report is to summarize data on the individual processes which might be important in describing the transport and fate of pollutants introduced at low concentrations (e.g., ppm or less) into aquatic environments. If transport processes will result in significant pollutant transfer to another medium (e.g., air, sediments), data are included where available to describe what happens to the pollutant in the medium to which the pollutant was transferred. A list of the literature covered in the search is included. Results of the literature search are that a significant amount of information on most pollutants was found, but that the information was more useful in making qualitative judgements about the pollutant transport and fate than for making quantitative predictions of concentrations in the environment. Availability of rate constants useful in mathematical fate models was limited.

PB80-204381 PC **A99**/MF **A01**
Versar, Inc., Springfield, VA.
Water-Related Environmental Fate of 129 Priority Pollutants. Volume II: Halogenated Aliphatic Hydrocarbons, Halogenated Ethers, Monocyclic Aromatics, Phthalate Esters, Polycyclic Aromatic Hydrocarbons, Nitrosamines, and Miscellaneous Compounds.
Final rept.,
Michael A. Callahan, Michael W. Slimak, Norman W. Gabel, Ira P. May, and Charles F. Fowler. Dec 79, 673p EPA-440/4-79-029B
Contract EPA-68-01-3852
See also Volume 1, PB80-204373. Sponsored in part by Grant EPA-68-01-3867. Prepared in cooperation with SRI International, Menlo Park, CA.

This report is a literature search and summary of relevant data for the individual fate processes (hydrolysis, biodegradation, photolysis, etc.) which might be expected to occur if a pollutant were introduced into an aquatic system. The report is organized into 101 individual chapters for pollutants or small groups of pollutants, and four introductory chapters. Each chapter has its own references so the chapters can be used independently.

PB80-204662 PC **A05**/MF **A01**
Wisconsin Univ.-Madison. Water Resources Center.
Assessment of Sewage Lagoons as Potential Fish Culture Sites in West Central Wisconsin.
Technical rept.,
Steven P. AveLallemant, and John W. Held.
1980, 92p WIS-WRC-80-10, W80-06076, OWRT-A-078-WIS(1)
Contracts DI-14-34-0001-8053, DI-14-34-0001-9053

The potential of wastewater treatment lagoons in Wisconsin for culturing fathead minnows (Pimphales promelas) was considered. The efficacy of this treatment strategy in terms of improving effluent water quality by reclaiming nutrients in the form of fish biomass and reducing treatment costs by providing marketable bait fish was assessed.

PB80-204704 PC **A04**/MF **A01**
Guam Univ., Agana. Water Resources Research Center.
Future Water Quality Monitoring Priorities for the Trust Territory of the Pacific Islands.
Technical rept. 1 Apr-30 Sep 80,
Peter A. Cowan. Jun 80, 70p TR-16, W80-05803, OWRT-A-020-GUAM(1)
Contract DI-14-34-0001-0112
Report on The Influence of Modern Water Supply and Wastewater Treatment Systems on Water Quality in Micronesia: Phase I.

Implementation of a comprehensive water quality monitoring program is not possible at the present time in the Trust Territory of the Pacific Island (TTPI). Due to the remoteness of these islands, any routine monitoring must be accomplished by local district sanitation officers. The highest priority monitoring strategy is the one which must be developed for the public water system (PWS). Total Coliform (TC), Free Residual Chlorine (FRC) and Turbidity analyses must be performed at least twice per month on water samples representative of the entire PWS in order to insure the delivery of safe drinking water to the public served by these systems.

PB80-204779 PC **A03**/MF **A01**
National Advisory Committee on Oceans and Atmosphere, Washington, DC.
Coastal Zone Management 1978. Findings and Recommendations; a Special Report to the President and the Congress.
Jan 79, 37p NACOA-6

The National Advisory Committee on Oceans and Atmosphere (NACOA) has reviewed the implementation of the Coastal Zone Management Act of 1972 (CZMA), both in light of the original objectives of the Act and in the context of the Nation's needs for coastal management today. NACOA concluded that the CZM program is falling short of its original goals, and that vital natural systems on the nation's coastline are more in need of protection today than they were in 1972. NACOA concluded that amendments to the CZMA itself, in addition to further improvements in the administrative process, will be necessary in order to achieve the objectives of the legislation. Furthermore, NACOA believes that the incentives established in the present Act could be restored to the level at which they were thought to exist in 1972; however, the CZMA must be amended to reverse the administrative interpretation which has tended to reduce incentives under the Act. NACOA's proposals are summarized.

PB80-204787 PC **A04**/MF **A01**
National Advisory Committee on Oceans and Atmosphere, Washington, DC.
Engineering in the Ocean; a Report for the Secretary of Commerce.
15 Nov 74, 58p NACOA-3

The NACOA panel came to the conclusions somewhat unwillingly that an organization rather than a specific program was needed. NACOA believes the national purpose would be served by the establishment of a modest organization to stimulate more foresighted development of ocean technology than now occures despite accelerating national activity in the oceans, and recommends there be established an institute for Engineering Research in the oceans. The functions would be to: Develop standards which presently, in ocean engineering, lag other fields.

PB80-204910 PC **A07**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Transportation Lab.
Statewide Flexible Pavement Performance and Deflection Study.
Final rept.,
John B. Skog, James A. Matthews, Gary W. Mann, and Donald V. Roberts. Dec 78, 128p TL-633167, FHWA-CA-TL-78-28
See also report dated Dec 68, PB-183 151.

Pavement deflection measurements are used to evaluate residual 'in-place' strength of flexible pavement sections. Asphalt concrete structural overlay thickness requirements for 10-year service life extensions are determined based on reduction of initial deflections to tolerable deflection levels for given conditions. Asphalt properties were studied to determine effects upon pavement performance and deflections of flexible pavements. Experimental materials and methods are studied under various climatic and traffic conditions in efforts to minimize or control pavement reflection cracking through AC overlays.

PB80-204977 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
Program Planning, Finance, and Preconstruction Management,
Lance A. Neumann, Joseph Dresser, Brent O. Bair, William J. Fognini, and John L. Grubba.
1980, 50p TRB/TRR-742, ISBN-0-309-03050-1
Library of Congress catalog card no. 80-18866.
Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

Contents:
- New approach for analyzing highway program choices and trade-offs;
- Highway risk management--a case study;
- Matrix project management in transportation--New York state experience;
- Suggested criteria and procedures for setting highway priorities;
- Highway funding--Arizona case study;
- Methodology for evaluating impacts of energy, national economy, and public policies on highway financing and performance;
- Systems approach to increasing preconstruction engineering productivity;
- Preconstruction engineering management in Washington--manpower management information system;
- Preconstruction engineering management in Virginia;
- Changing criteria for project evaluation and priority setting.

PB80-205271 PC **A05**/MF **A01**
Texas Transportation Inst., College Station.
Truck Utilization of the I-45N Contraflow Lane in Houston, Texas.
Interim rept. Sep 73-May 79,
R. W. Holder, D. L. Christiansen, C. A. Fuhs, and George B. Dresser. May 79, 94p TTI-2-10-74-205-6, FHWA/TX-79/40-205-6
Report on Priority Use of Freeway Facilities.

The report was to document the gathering of truck movement data on the North Freeway (I-45N) in Houston, Texas, primarily to determine the potential for trucks to use the proposed North Freeway contraflow lane. However, the final result of the study was the compilation of detailed traffic flow data concerning all traffic using the North Freeway. The data collection methods included interviews with major truck terminal operators, and both a.m. and p.m. peak-period data collection (using time-lapse photography) at two locations on the freeway. While the data might provide a useful base for evaluating other urban transportation problems such as the need for separate truck lanes, the evaluation concluded that few trucks would choose to utilize the proposed contraflow lane.

PB80-205784 PC **A05**/MF **A01**
Research Group, Inc., Atlanta, GA.
Comprehensive Interstate Policy Development for the Savannah River Basin: A Feasibility Assessment.
Rept. for Nov 77-Jun 78.
27 Apr 78, 78p CPRC/C-80/15
Contract CPRC-10840009

The study was conducted to identify the need for and feasibility of an interstate policy development program for the Savannah River Basin. This report summarizes the approach to the study, major findings, and recommendations for a continuing interstate policy development effort.

PB80-205842 PC **A06**/MF **A01**
New England River Basins Commission, Boston, MA.
Choosing Offshore Pipeline Routes: Problems and Solutions.
Final rept.,
Ann M. Gowen, M. J. Goetz, and I. M. Waitsman.
May 80, 107p EPA-600/7-80-114

The report discusses the environmental and fisheries problems associated with offshore pipelines. The report focuses on how these problems can be addressed during the pipeline planning and route selection process. Geologic hazards are highlighted as the major factors related to pipeline failure which can be addressed through the pipeline routing process. Habitats and ecosystems are particularly susceptible to installation-related disturbances. These areas as well as those where geologic hazards are most likely to be encountered are described. Fishing problems highlighted include loss of access to fishing areas due to pipelines both from platform to shore and between platforms. The effects of obstructions on bottom fishing gear are also considered. The concept of pipeline trenching for safety and stability is discussed. Finally, criteria to use in analyzing a proposed pipeline route are presented. Topics discussed include general industry siting criteria, geologic and envi-

ronmental areas to avoid in pipeline siting and methods for minimizing unavoidable impacts. The report is designed to be used by scientists or engineers involved in offshore petroleum pipeline planning.

PB80-206006 PC **A12**/MF **A01**
Byrd, Tallamy, MacDonald and Lewis, Falls Church, VA.
Traffic Control for Street and Highway Construction and Maintenance Operations. Participant Notebook (Third Edition).
1978, 275p
Contract DOT-FH-11-8525

The basic objective of this training course is to provide information, guidelines and tools which will enable those persons with traffic control responsibilities to create safe and cost effective traffic control procedures for the full range of highway worksite situtations. The course addresses the specific areas of worksite traffic control. For each of the following characteristics a broad range of coverage is provided: (1) All road types-including streets, highways and limited access facilities; (2) Construction and maintenance activities and utility operations; (3) Work locations both in and adjacent to the traveled way; (4) Rural and urban environs; and (5) Planning, designing, installing, operating, maintaining and removing functions and emergency and disaster situations. The course is designed for presentation to federal, state and local agency personnel and utility and contracting company employees involved in traffic control. Participants may include engineers, technicians and supervisory personnel who have a responsibility for planning, designing, installing, operating and/or inspecting worksite traffic control procedures.

PB80-206030 PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guidance for Collection of Ambient Non-Methane Organic Compound (NMOC) Data for Use in 1982 Ozone SIP Development, and Network Design and Siting Criteria for the NMOC and NOx Monitors.
Jun 80, 27p EPA-450/4-80-011

Guidance is given on the selection, siting and use of NMOC monitoring instruments for use in preparing 1982 Ozone SIPs. Some of the commercially available NMOC continuous monitors can provide data useful for modeling and for development of NMOC abatement strategies, if they are carefully maintained and calibrated. Collection of grab samples of ambient air for subsequent analysis by GC methods may be needed if a photochemical model is to be used, but this may be better done by a contractor.

PB80-206105 PC **A07**/MF **A01**
York Univ. (England). Dept. of Biology.
The Status and Management of the Harp Seal in the North-West Atlantic: A Review and Evaluation.
Final rept. Jan-Sep 79,
J. R. Beddington, and H. A. Williams. Jul 80, 140p MMC-79/03
Contract MM1301062-1

This study initially reviews the history of exploitation and management of the harp seal in the northwest Atlantic up to the present time. A consideration of the life history and biology of this species indicates a need for investigation of the implication of current harvesting which involves both the harp seal and several of its prey species.

PB80-207152 PC **A16**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters: Section VIII - Analysis of Distress. Part II (with Appendices F thru S).
Interim rept.,
R. E. Davis, F. M. Semans, D. W. Spannagel, and A. D. Bacher. May 79, 368p FHWA/CA/SD-79/13
See also Section 8, Part 1, PB80-176290.

Structural behavior of the reinforced concrete pipe culvert at Cross Canyon is evaluated on the basis of chronological observations of distress. Cracking patterns at successive overfills were recorded by mapping (sketching) and photographically, and diameter changes were assessed from extensometer readings. Records of significant crack widths were tabulated and are discussed in project diaries. These data are compiled in this section of the project report. The behavior of the various zones comprising the pipe is compared by ranking the zones on the basis of distress exhibited. Explanations of behavior are provided, based on observed soil stress profiles and neutral point analyses based thereupon. Zones with low modulus inclusions (induced trench, Method B backfill) exhibited superior performance at the higher overfills but not at the lower ones. A plot of permissible overfills for various pipe strengths, based on first appearance of 'industry-defined' failure or delamination, is furnished for the entrenched zones with ordinary (Method A) backfill.

PB80-207434 PC **A10**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Environmental and Economic Effects of Residential Development on Mayo Peninsula, Anne Arundel County, Maryland,
W. Conner, P. deWitt, R. Hoffer, M. Leslie, and D. Schultz. Jun 79, 218p MTR-79W00108, NOAA-80061109
Prepared in cooperation with Maryland Dept. of Natural Resources, Annapolis.

Chesapeake Bay Village, Inc. has proposed to develop a 341-acre site on the Chesapeake Bay on the Mayo Peninsula just south of Annapolis, Maryland. This study, while providing data for permit decisions on this particular project, was also designed to provide a framework for evaluation of environmental and economic impacts of subdivisions that might be proposed for the coastal zone in the future. The site proposed for development is former agricultural land that is presently in a state of natural plant succession back to typical coastal plain forest. Development of Chesapeake Bay Village would alter terrestrial, wetland and aquatic ecosystem on the proposed site and in the adjacent Chesapeake Bay. Present terrestrial ecosystems would be almost completely eliminated.

PB80-207442 PC **A14**/MF **A01**
Maryland Dept. of Natural Resources, Annapolis.
Interim Beach Maintenance at Ocean City.
1979, 319p NOAA-80061108

The proposed action is to provide interim beach maintenance of Ocean City, Maryland beach. The interim approach consists of constructing a system of short groins along the northernmost 8 miles of Ocean City beach. The proposed action is expected to stabilize the existing beach and thereby maintain the recreation potential and storm protection presently provided by the beach.

PB80-207574 PC **A04**/MF **A01**
KLD Associates, Inc., Huntington, NY.
Motorists Needs for Services Information on Interstate and Federal-Aid Primary Highways. Executive Summary.
Final rept.,
Gerhart F. King, and Mark R. Wilkinson. Feb 80, 63p KLD-TR-75A, FHWA/RD-80/010
Contract DOT-FH-11-9340

The volume is an Executive Summary which contains the results of a comprehensive State-of-the-Art review on the topic of motorists needs for information on travel related goods and services. Based on the results of this review, a conceptual prototype information system designed to satisfy these information needs through the use of existing information transmission techniques was developed. This prototype system was used as a yardstick in the evaluation of existing goods and services information systems. Problems in information needs satisfaction are identified, the implementation of an information system is recommended and additional research needs are identified.

PB80-207608 PC **A07**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Prediction of Entrainment/Impingement Impact for Striped Bass Eggs and Larvae by the Proposed Vienna Unit No. 9,
Edward M. Portner, and Lawrence C. Kohlenstein. Nov 79, 143p PPSP/JHU/PPSE-8-1

The average annual entrainment/impingement of striped bass eggs and larvae in the Nanticoke River by the proposed 600 MWE Vienna Unit No. 9 is estimated to be 2.0% for a cooling water intake rate of 17.6 cubic feet per second and the use of a one millimeter slot intake screen with 100% operation during the spawning season. The effect on the adult population of Striped Bass spawned in the Nanticoke River would probably be a reduction of less than 4% given stock sizes in the range that have occurred in recent decades. There is a possibility that natural compensation active in early life stages could reduce this impact.

PB80-207798 PC **A16**/MF **A01**
Associated Environmental Consultants, Charlottesville, VA.
APTI (Air Pollution Training Institute) Course 427: Combustion Evaluation, Student Manual,
J. Taylor Beard, F. Antonio Iachetta, and Lembit U. Lilleleht. Feb 80, 364p EPA-450/2-80-063
Contract EPA-68-02-2893
See also PB80-207806.

This Student Manual is used in conjunction with Course No. 427, 'Combustion Evaluation' as applied to air pollution control situations. This manual was prepared by the EPA Air Pollution Training Institute (APTI) to supplement the course lecture materials and to present detailed reference information on the following topics: combustion fundamentals, fuel properties, combustion system design, pollutant emission evaluations, combustion control, gas, oil, and coal burning, solid waste and wood burning, incineration of wastes, sewage sludge incineration, waste gas flares, hazardous waste combustion, NOx control, and improved combustion systems. Note: There is also an Instructor's Guide to be used in conducting the training course - (EPA-450/2-80-065) and a Student Workbook to be used for homework and in-class problem solving - (EPA-450/2-80-64).

PB80-207806 PC **A12**/MF **A01**
Associated Environmental Consultants, Charlottesville, VA.
APTI (Air Pollution Training Institute) Course 427: Combustion Evaluation, Instructor's Guide,
J. Taylor Beard, F. Antonio Iachetta, and Lembit U. Lilleleht. Feb 80, 275p EPA-450/2-80-065
Contract EPA-68-02-2893
See also PB80-207798.

This Instructor's Guide is used in conjunction with Course No. 427, 'Combustion Evaluation' as applied to air pollution control situations. The teaching guide was prepared by the EPA Air Pollution Training Institute (APTI) to assist instructors in presenting course No. 427. The guide contains sections on the following topics: combustion fundamentals, fuel properties, combustion system design, pollutant emission calculations, combustion control, gas, oil, and burning, solid waste and wood burning, incineration of wastes, sewage sludge incineration, flame and catalytic incineration, waste gas flares, hazardous waste combustion, NOx control, improved combustion systems. Note: There is also a Student Workbook to be used for homework and in-class problem solving (EPA-450/2-80-064) and a Student Manual for reference and additional subject material (EPA-450/2-80-063).

PB80-208895 PC **A14**/MF **A01**
Northrop Services, Inc., Research Triangle Park, NC.
APTI (Air Pollution Training Institute) Course 413: Control of Particulte Emissions, Instructor's Guide,
D. Beachler, G. Aldina, and J. Jahnke. Mar 80, 303p EPA-450/2-80-068
Contract EPA-68-02-2374

The Instructor's Guide for the Air Pollution Training Institute Course 413, 'Control of Particulate Emissions,' contains complete information for conducting a 4 day course in particulate emissions control. The Guide contains course goals and objectives, preparation instructions, lesson plans, exams and exam keys, solutions to problem sets, and copies of handout materials. The lesson plans include keys to 35 mm slides developed for the course and suggested instructional techniques. This Guide is intended for use in conjunction with the Student

Manual (EPA 450/2-80-066) and the Student Workbook (EPA 450/2-80-067) for APTI Course 413.

PB80-209471 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab., Research Triangle Park, NC. Statistical and Technical Analysis Branch.
Refinements of the Lognormal Probability Model for Analysis of Aerometric Data.
Journal article,
David T. Mage, and Wayne R. Ott. 1978, 5p
EPA-600/J-78-109
Pub. in Jnl. of Air Pollution Control Association, v28 n8 p796-798 Aug 78.

Logarithmic probability plots of air quality data, commonly described as 'approximately straight lines', are shown to have consistent curvature. These curves appear to follow the form of a censored three-parameter lognormal distribution. A procedure for fitting these data is discussed in which a statistical criterion for goodness-of-fit is used to guide the analyst.

PNL-TR-357 PC **A03**/MF **A01**
Driving of Gate Roads with the Krupp 340 Tunnel-Cutting Machine.
M. Arcypowski, and K. Troesken. 1971, 29p
Contract EY-76-C-06-1830
A, Glueckauf, 107 n23 P880-885 1971.

The report describes the new machine and reports on the progress of driving two gate roads as well as on the driving performances achieved and the experience acquired. (ERA citation 05:006113)

PNL-2945 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Source Characterization Studies at the Paraho Semiworks Oil Shale Retort.
J. S. Fruchter, C. L. Wilkerson, J. C. Evans, R. W. Sanders, and K. W. Abel. May 79, 171p
Contract EY-76-C-06-1830

In order to determine the redistribution of trace and major elements and species during aboveground oil shale retorting, a comprehensive program was carried out for the sampling and analysis of feedstock, products, effluents, and ambient particulates from the Paraho Semiworks Retort. Samples were obtained during two periods in 1977 when the retort was operating in the direct mode. The data were used to construct mass balances for 31 trace and major elements in various effluents, including the offgas. The computed mass balances indicated that approx. 1% or greater fractions of the As, Co, Hg, N, Ni, S, and Se were released during retorting and redistributed to the product oil, retort water, or product offgas. The fraction released for these seven elements ranged from approx. 1% for Co and Ni to 50 to 60% for Hg and N. Approximately 20% of the S and 5% each of the As and Se were released. Ambient aerosols were found to be elevated near the retorting facility and associated crushing and retorted shale disposal sites. Approximately 50% of these particles were in the respirable range (< 5 mu m). The elevated dust loadings are presented very local, as indicated by relatively low aerosol loadings at background sites 100 to 200 m away. State-of-the-art dust control measures were not employed. 15 figures, 19 tables. (ERA citation 05:002538)

SAI-77-970-LJ PC **A10**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Environmental Impact Analysis of Electric and Hybrid Vehicle Batteries. Final Report.
16 Dec 77, 214p
Contract EC-77-C-02-4526

This environmental impact analysis of electric and hybrid vehicle batteries is intended to identify principal environmental impacts resulting directly or indirectly from the development of electric vehicle batteries. The environmental impacts considered are the incremental impacts generated during the various phases in a battery's life cycle. The processes investigated include mining, milling, smelting, and refining of metallic materials for electrode components, manufacturing processes of inorganic chemicals and other materials for electrolytes and other hardware components, battery assembly processes, operation and maintenance of batteries, and recycling and disposal of used batteries. The severity of the incremental impacts is quantified to the extent consistent with the state-of-knowledge. It is noted that many of the industrial processes involve proprietary or patent information, thus in many cases the associated environmental impacts could not be determined. It is also pointed out that most candidate battery systems are still in the development phase. Thus, the manufacturing and recycling processes for most battery systems either have not been developed by industry, or the information is not available. For these cases, the associated environmental impact evaluations could only be qualitative and the need for further investigations is indicated. (ERA citation 05:007579)

SAND-78-2283C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Steady Thermal Convection from a Concentrated Source in a Porous Medium.
C. E. Hickox, and H. A. Watts. 1979, 25p CONF-790808-9
Contract EY-76-C-04-0789
18. ASME national heat transfer conference, San Diego, CA, USA, Aug 1979.

Solutions for the axisymmetric velocity and temperature fields associated with a point source of thermal energy in a fluid-saturated porous medium are obtained numerically through use of similarity transformations. The two cases considered are those of a point source located on the lower boundary of a semi-infinite region and a point source embedded in an infinite region. Tabulated results are presented from which complete descriptions of the velocity and temperature fields can be constructed for Rayleigh numbers of 0.1, 1, 10, and 100. (ERA citation 04:047228)

SAND-79-8056 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Particulate Size Measurements Using Light Scattering Techniques.
J. C. F. Wang, and D. Tichenor. Sep 79, 36p CONF-790855-4
Contract EY-76-C-04-0789
Symposium on instrumentation and control for fossil energy processes, Denver, CO, USA, 20 Aug 1979.

Particle size distribution measurements using a small-angle near-forward light scattering (SANFS) arrangement have been found to be a promising technique for applications in combustor environments and advanced power systems. In this paper, characteristics of the light scattering response for this optical arrangement are discussed in detail based on Mie theory calculations. Preliminary data from a bench-scale experiment and a means to improve measurement accuracy are reported. (ERA citation 05:003600)

UCID-17744-79-3 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Chemical Effluents in Surface Waters from Nuclear Power Plants. Quarterly Progress Report.
F. L. Harrison. 13 Aug 79, 13p
Contract W-7405-ENG-48

A yield study was conducted at the Vermont Yankee Nuclear Power Station to determine: (1) the concentrations of copper in circulating waters while changing from open to closed cycle operation; and (2) the copper concentrations in sediment in the cooling tower basin. Copper concentrations in the circulating waters increased during changeover. The peak concentration in the soluble fraction of the water from the east cooling tower during changeover was 24 mu g Cu/l in 1978 compared to 570 mu g Cu/l in 1979; in the west cooling tower the peak concentration was 144 mu g Cu/l in 1979. Copper concentrations in the sediment from the west cooling tower basin were much higher than those in the sediment in the discharge zone; the highest concentration in the discharge zone and cooling tower basin were 22 and 860 mu g Cu/g dry weight, respectively. Copper concentration in the interstitial waters of the west cooling tower sediment were positively correlated to those in the sediment. In the basin, a marked gradient in copper concentration from Cells 1 to 11 was found both in the particles and interstitial waters. Additional studies on the toxic response of Corbicula manilensis to copper indicate that this freshwater clam is sensitive to copper concentrations as low as 10 mu g/l. (ERA citation 05:000951)

UCID-17744-79-4 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Chemical Effluents in Surface Waters from Nuclear Power Plants: Research Order No. 60-79-002. Quarterly Progress Report.
F. L. Harrison. 1 Nov 79, 11p
Contract W-7405-ENG-48

Samples of circulating water and cooling tower basin sediment were collected at the Vermont Yankee Nuclear Power Station in July and September 1979. Total copper concentrations in the water circulating in the tower cooling system were about 190 mu g/l. Approximately 60% of the copper was in the soluble fraction. The marked gradients in copper concentrations in the sediment and interstitial water that were detected in June were still present in July and September. However, the copper concentrations in the solid phase appear to be changing at different rates and direction from those in the liquid phase. The cause of the gradient and the processes producing the changes were not immediately apparent. (ERA citation 05:007627)

UT/CES-GR-3 PC **A05**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
The Geopressured Geothermal Resources of Texas: Regulatory Controls over Water Pollution.
K. E. Rogers, and A. W. Oberbeck. 1 Jul 77, 85p
Contract EY-76-S-05-5243

The following are presented: an overview of the control framework, Federal pollution control of surface waters, state water pollution control in Texas, new Federal standards for underground injection control, and a summary assessment. (ERA citation 04:036210)

13C. Construction Equipment Materials, and Supplies

AD-A086 667/3 PC **A07**/MF **A01**
Polytechnic Inst of New York Brooklyn
Wave Propagation in Honeycomb and Foam-Core Panels for Application to Panel NDE.
Final technical rept. 1 Jul 77-11 Oct 79,
Henry L. Bertoni, and S. K. Park. Apr 80, 140p
RADC-TR-80-112
Contract F19628-77-C-0130

For rapid inspection, it is most useful to consider acoustic waves traveling along the larger dimensions of the panels. A study was made of the waves propagating in the honeycomb itself, particularly in the frequency range where the wavelength is on the order of the cell diameter. The characteristics of Bloch waves propagating in a honeycomb of infinite extent were calculated. At low frequencies, the honeycomb was found to act as an elastic continuum. At high frequencies, the periodicity and anisotropy of the honeycomb affect the propagation of the Bloch waves, and result in the presence of stop bands for propagation in certain directions. Computations of the frequency dependence, direction dependence, and polarization of the Bloch waves were made. In addition, the propagation characteristics of the waves guided by an aluminum face plate bonded to a honeycomb of semi-finite extent were studied in the low frequency range where the honeycomb acts as an elastic absorber. It was found that the presence of the honeycomb strongly perturbs the waves guided by the face plate, so that one can expect to inspect for de-bonded regions by measuring propagation characteristics. Similar results were found for a foam core bonded to an aluminum face plate. In this case, a glue layer bonding face plate to the foam was also considered and found to have a significant effect on the guided waves.

PB80-202922 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.

Stone Consolidating Materials - A Status Report.
Final rept.,
James R. Clifton. May 80, 57p NBS-TN-1118
Sponsored in part by National Park Service, Washington, DC.

Information on types of stone consolidating materials, their performances, and uses are critically reviewed. Processes responsible for the deterioration of stone and criteria for selecting stone consolidants are also reviewed. The main function of stone consolidants is to reestablish the cohesion between particles of deteriorated stone. In addition, a good consolidant should meet performance requirements concerning durability, depth of penetration, effect on stone porosity, effect on moisture transfer, compatibility with stone, and effect on appearance. Stone consolidants can be divided into four main groups, according to their chemistry. These groups are inorganic materials, alkoxysilanes, synthetic organic polymers, and waxes. Epoxies, acrylics, and alkoxysilanes are currently the most commonly used consolidating materials. Certain waxes have been found to have excellent consolidating abilities. Waxes, however, tend to soften and to accumulate grime and dust. Inorganic materials and some organic polymers have a tendency to form shallow, brittle layers near the surface of stone. These treated layers often separate from the untreated stone. Alkoxysilanes have excellent penetrabilities and are considered by some stone conservators as the most promising consolidating materials. However, a universal consolidant does not exist and many factors must be considered in selecting a consolidant for a specific stone structure.

PB80-203631 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
A Study of Lumber Used for Bracing Trenches in the United States.
Building science series (Final),
Lawrence I. Knab, Felix Y. Yokel, William L. Galligan, B. Alan Bendtsen, and John F. Senft.
Mar 80, 173p NBS-BSS-122
Sponsored in part by Occupational Safety and Health Administration, Washington, DC. Prepared in cooperation with Forest Products Lab., Madison, WI., and Purdue Univ., Lafayette, IN. Dept. of Forestry and Natural Resources. Library of Congress catalog card no. 80-600015.

This report presents a study of the properties and characteristics of trenching lumber which are critical to its structural performance. Using these properties and characteristics, allowable stresses and use recommendations are proposed. The National Bureau of Standards (NBS) conducted a field study of trenching lumber and found that either ungraded eastern species, primarily hardwood, or graded Douglas-fir is used. For graded Douglas-fir, allowable design stresses and other properties are established by existing standards. The eastern species, however, are ungraded and no accepted guidelines are used to assign allowable design stresses and other properties.

PB80-205628 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Performance of Pavements Designed with Low-Cost Materials,
Robert W. Grau, W. A. Yrjanson, R. G. Packard, Richard D. Barksdale, and Charles F. Potts.
1980, 58p TRB/TRR-741, ISBN-0-309-02999-6
Library of Congress catalog card no. 80-17917. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

The 7 papers in this report deal with the following areas: utilization of marginal aggregate materials for secondary road surface layers; econocrete pavements; current practices; construction and performance of sand-asphalt bases; performance of sand-asphalt and limerock pavements in Florida; cement stabilization of degrading aggregates; use of crushed stone screenings in highway construction (abridgement); and sulfur-asphalt pavement technology--a review of progress.

RHO-C-27 PC **A02**/MF **A01**
Portland Cement Association, Skokie, IL. Construction Technology Labs.
Creep and Cycling Tests: Thermal Properties of Hanford Concretes.
M. Gillen. Mar 79, 23p
Contract EY-76-C-14-2170

Four tests were conducted to determine thermal properties of concrete core material from the Purex Building at Hanford, Washington, and from concrete cast at the Portland Cement Association. Specific heat, thermal conductivity, and thermal diffusivity were measured as functions of temperature from 79 to 1175F. (ERA citation 05:006013)

13E. Couplings, Fittings, Fasteners, and Joints

PNL-TR-371 PC **A03**/MF **A01**
Estimation of Weld Defect Dimensions by Supersonic Oblique Angle B-Scope Method.
B. Kato, K. Morita, and H. Furuzawa. Dec 73, 30p
Contract EY-76-C-06-1830
A n214 P7-15 Dec 1973.

The following findings were obtained within the range of the tests: (1) the state of distribution of welding defects and their range can be recorded sufficiently by one photograph by the supersonic oblique angle B-scope method; (2) in estimating the defect lengths of surface defects and slag inclusions by the supersonic oblique angle B-scope method, one may determine in advance the amount of correction for the defect length by means of slit specimens; (3) a study was made of methods for using the supersonic oblique angle B-scope method for estimating the sectional shapes of weld root defects, and some results were obtained; and (4) if the amount of correction for the defect height is determined in advance by means of slit specimens, the heights of weld root defects can be estimated with a certain degree of accuracy by means of the supersonic oblique angle B-scope method. (ERA citation 05:007517)

13F. Ground Transportation Equipment

AD-A086 586/5 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Development of a High-Speed Rotary Snowplow (HTR-700),
Tetsuya Sasaki, and Go Horikawa. Mar 79, 29p
Rept no. CRREL-TRANS-709
Trans. from Engineering Report, v6 n46 p38-50 N.D.

No abstract available.

N80-27805/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Impact of Propulsion System R and D on Electric Vehicle Performance and Cost.
H. J. Schwartz, and A. L. Gordan. 22 May 80, 16p NASA-TM-81548, DOE/NASA/1044-9
Contract EC-77-A-31-1044
Presented at 3D Intern. Electric Vehicle Exposition and Conf., St. Louis, 20-22 May 1980.

The efficiency, weight, and manufacturing cost of the propulsion subsystem (motor, motor controller, transmission, and differential, but excluding the battery) are major factors in the purchase price and cost of ownership of a traffic-compatible electric vehicle. The relative impact of each was studied, and the conclusions reached are that propulsion system technology advances can result in a major reduction of the sticker price of an electric vehicle and a smaller, but significant, reduction in overall cost of ownership.

N80-28245/2 PC **A07**/MF **A01**
Fiat Research Center, Orbassano (Italy).
Phase 1 of the Near Term Hybrid Passenger Vehicle Development Program.
Final Report.
P. Montalenti, and R. Piccolo. 21 Sep 79, 143p
NASA-CR-163219, JPL-9950-330
Contract JPL-955197

In order to meet project requirements and be competitive in the 1985 market, the proposed six-passenger vehicle incorporates a high power type Ni-Zn battery, which by making electric-only traction possible, permits the achievement of an optimized control strategy based on electric-only traction to a set battery depth of discharge, followed by hybrid operation with thermal primary energy. This results in a highly efficient hybrid propulsion subsystem. Technical solutions are available to contain energy waste by reducing vehicle weight, rolling resistance, and drag coefficient. Repoacing new 1985 full size vehicles of the conventional type with hybrids of the proposed type would result in a U.S. average gasoline saving per vehicle of 1,261 liters/year and an average energy saving per vehicle of 27,133 MJ/year.

N80-28246/0 PC **A08**/MF **A01**
Fiat Research Center, Orbassano (Italy).
Phase 1 of the Near Term Hybrid Passenger Vehicles Development Program. Appendix a: Mission Analysis and Performance Specification Studies, Volume 1.
Final Report.
M. Traversi, and L. A. C. Barbarek. 20 Apr 79, 157p NASA-CR-163220, JPL-9950-330
Contract JPL-955187

Applicable data was categorized and processed according to vehicle usage and trip parameters with consideration of payload (cargo, people, size) and driving cycles. A mission that maximizes the fuel potential savings for the total 1985 vehicle fleet was selected. Mission requirements that have a bearing on conventional and hybrid vehicle performance and characteristics were identified and formulated and a reference ICE vehicle was selected that meets or exceeds all requirements while maintaining within applicable constraints. Specifications for vehicle performance were established based on mission requirements, mission related vehicle characteristics, and fuel consumption.

N80-28247/8 PC **A05**/MF **A01**
Fiat Research Center, Orbassano (Italy).
Phase 1 of the Near Term Hybrid Passenger Vehicle Development Program, Appendix a. Mission Analysis and Performance Specification Studies. Volume 2: Appendices.
Final Report.
M. Traversi, and L. A. C. Barbarek. 18 May 79, 83p NASA-CR-163221, JPL-9950-330
Contract JPL-955187

A handy reference for JPL minimum requirements and guidelines is presented as well as information on the use of the fundamental information source represented by the Nationwide Personal Transportation Survey. Data on U.S. demographic statistics and highway speeds are included along with methodology for normal parameters evaluation, synthesis of daily distance distributions, and projection of car ownership districutions. The synthesis of tentative mission quantification results, of intermediate mission quantification results, and of mission quantification parameters are considered and 1985 in place fleet fuel economy data are included.

N80-28248/6 PC **A07**/MF **A01**
Fiat Research Center, Orbassano (Italy).
Phase 1 of the Near Term Hybrid Passenger Vehicle Development Program. Appendix B: Trade-off Studies, Volume 1.
Final Report.
M. Traversi, and R. Piccolo. 11 Jun 80, 131p
NASA-CR-163222, JPL-9950-330
Contract JPL-955187

Tradeoff study activities and the analysis process used are described with emphasis on (1) review of the alternatives; (2) vehicle architecture; and (3) evaluation of the propulsion system alternatives; interim results are presented for the basic hybrid vehicle characterization; vehicle scheme development; propulsion system power and transmission ratios; vehicle weight; energy consumption and emissions; performance; production costs; reliability, availability and maintainability; life cycle costs, and operational quality. The final vehicle conceptual design is examined.

N80-28249/4 PC **A12**/MF **A01**
Fiat Research Center, Orbassano (Italy).
Phase 1 of the Near Team Hybrid Passenger Vehicle Development Program. Appendix C: Preliminary Design Data Package, Volume 1.
Final Report.
R. Piccolo. 31 Jul 79, 259p NASA-CR-163223, JPL-9950-330
Contract JPL-955187

The methodology used for vehicle layout and component definition is described as well as techniques for system optimization and energy evaluation. The preliminary design is examined with particular attention given to body and structure; propulsion system; crash analysis and handling; internal combustion engine; DC motor separately excited; Ni-Zn battery; transmission; control system; vehicle auxiliarries; weight breakdown, and life cycle costs. Formulas are given for the quantification of energy consumption and results are compared with the reference vehicle.

N80-28250/2 PC **A04**/MF **A01**
Fiat Research Center, Orbassano (Italy).
Phase 1 of the Near Term Hybrid Passenger Vehicle Development Program. Appendix B: Trade-off Studies. Volume 2: Appendices.
Final Report.
M. Traversi, and R. Piccolo. 15 Jun 79, 51p NASA-CR-163224, JPL-9950-330
Contract JPL-955187

The SPEC '78 computer program which consists of mathmmatical simulations of any vehicle component and external environment is described as are configuration alternatives for the propulsion system. Preliminary assessments of the fundamental characteristics of the lead-acid and sodium-sulfur batteries are included and procedures are given for estimating the cost of a new vehicle in mass production.

N80-28251/0 PC **A06**/MF **A01**
Fiat Research Center, Orbassano (Italy).
Phase 1 of the Near Team Hybrid Passenger Vehicle Development Program. Appendic C: Preliminary Design Data Package. Volume 2: Appendices.
Final Report.
R. Piccolo. 11 Sep 79, 124p NASA-CR-163225, JPL-9950-330
Contract JPL-955187

The design, development, efficiency, manufacturability, production costs, life cycle cost, and safety of sodium-sulfur, nickel-zinc, and lead-acid batteries for electric hybrid vehicles are discussed. Models are given for simulating the vehicle handling quality, and for finding the valuve of: (1) the various magnetic quantities in the different sections in which the magnetic circuit of the DC electric machine is divided; (2) flux distribution in the air gap and the magnetization curve under load conditions; and (3) the mechanical power curves versus motor speed at different values of armature current.

N80-28252/8 PC **A03**/MF **A01**
Fiat Research Center, Orbassano (Italy).
Phase 1 of the Near Term Hybrid Passenger Vehicle Development Program. Appendix D: Sensitivity Analysis.
Final Report.
M. Traversi. 3 Jul 79, 50p NASA-CR-163226, JPL-9950-330
Contract JPL-955187

Data are presented on the sensitivity of: (1) mission analysis results to the boundary values given for number of passenger cars and average annual vehicle miles traveled per car; (2) vehicle characteristics and performance to specifications; and (3) tradeoff study results to the expected parameters.

N80-28254/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Preliminary Results of Steady State Characterization of Near Term Electric Vehicle Breadboard Propulsion System.
N. B. Sargent. Jul 80, 10p NASA-TM-81546, DOE/NASA/1011-31
Contract EC-77-A-31-1011

The steady state test results on a breadboard version of the General Electric Near Term Electric Vehicle (ETV-1) are discussed. The breadboard was built using exact duplicate vehicle propulsion system components with few exceptions. Full instrumentation was provided to measure individual component efficiencies. Tests were conducted on a 50 hp dynamometer in a road load simulator facility. Characterization of the propulsion system over the lower half of the speed-torque operating range has shown the system efficiency to be composed of a predominant motor loss plus a speed dependent transaxle loss. At the lower speeds with normal road loads the armature chopper loss is also a significant factor. At the conditions corresponding to a cycle for which the vehicle system was specifically designed, the efficiencies are near optimum.

N80-28255/1 PC **A17**/MF **A01**
Eaton Engineering and Research Center, Southfield, MI.
Small Passenger Car Transmission Test-Chevrolet 200 Transmission.
Final Report.
M. P. Bujold. Mar 80, 381p NASA-CR-159835, DOE/NASA/0124-1
Contracts DEN3-124, EC-77-A-31-1044

The small passenger car transmission was tested to supply electric vehicle manufacturers with technical information regarding the performance of commerically available transmissions which would enable them to design a more energy efficient vehicle. With this information the manufacturers could estimate vehicle driving range as well as speed and torque requirements for specific road load performance characteristics. A 1979 Chevrolet Model 200 automatic transmission was tested per a passenger car automatic transmission test code (SAE J651b) which required drive performance, coast performance, and no load test conditions. The transmission attained maximum efficiencies in the mid-eighty percent range for both drive performance tests and coast performance tests. Torque, speed and efficiency curves map the complete performance characteristics for Chevrolet Model 200 transmission.

PAT-APPL-6-022 895 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Improved Tool Grinding Machine.
Patent Application,
C. E. Dial, Sr. Filed 22 Mar 79, 10p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to an improved tool grinding mechanism for grinding single point diamond cutting tools to precise roundness and radius specifications. The present invention utilizes a tool holder which is longitudinally displaced with respect to the remainder of the grinding system due to contact of the tool with the grinding surface with this displacement being monitored so that any variation in the grinding of the cutting surface such as caused by crystal orientation or tool thicknesses may be compensated for during the grinding operation to assure the attainment of the desired cutting tool face specifications. (ERA citation 05:029427)

PAT-APPL-6-022 898 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Apparatus for Correcting Precision Errors in Slide Straightness in Machine Tools.
Patent Application,
S. C. Robinson, and H. L. Gerth. Filed 22 Mar 79, 10p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention is directed to a mechanism by which small deviations in slideway straightness and roll of a precision machining apparatus may be compensated for. The mechanism of the present invention comprises a fixture support disposed between the slideway carriage and the tool or workpiece fixture and provided with a hinge-like coupling between the carriage and the fixture support so as to allow for the minute and precise displacement of the fixture support in a direction normal to the direction of the slide path soa as to readily compensate for slight deviations in the straightness and roll of the slide path. (ERA citation 05:029426)

PB80-198609 PC **A06**/MF **A01**
ENSCO, Inc., Alexandria, VA. Engineering Test and Analysis Div.
Use of Automatically Acquired Track Geometry Data for Maintenance-of-Way Planning.
Final rept.,
G. Hayes, K. Bradley, B. Price, D. Sawyer, and A. Dominguez. Jun 80, 125p ENSCO/DOT/FR-79-20, DOT/FR-80/44
Contract DOT-FR-64113

This report covers a joint FRA/Rail Industry Program to develop maintenance planning techniques based on regularly-scheduled automated track-geometry-measurements and maintenance-of-way reports. The study was conducted from 1971 through 1978 with the cooperation of the Bessemer and Lake Erie, and the Denver and Rio Grande Western Railroads. As a result of the program, maintenance-of-way reports generated from track-geometry-measurement data have been used by the participating railroads in their maintenance planning and in the improvement of their overall track safety.

PB80-200256 PC **A07**/MF **A01**
Ministerstvo Putei Soobshcheniya SSSR, Moscow.
Equipment of USSR Railways.
1976, 146p
Text in Russian and English.

Illustrations and specifications are provided of equipment used by the Soviet Railway network. Included are electric and diesel locomotives, passenger and freight cars, track laying and maintenance equipment, automatic and remote control equipment, computer equipment, passenger station equipment, and freight handling equipment.

PB80-200801 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
Carbon Balance and Volumetric Measurements of Fuel Consumption.
Technical rept.,
Terry Newell. Apr 80, 11p EPA-AA-SDSB-80-05

A recently completed EPA test program investigated the effects on emissions and fuel consumption of different types and brands of tires. In that program, fuel consumption was measured using both the carbon balance and volumetric methods. The number of tests conducted provided adequate data for a comparison of the results obtained by these different methods. A previously conducted investigation into the differences between carbon balance and volumetric measurements of fuel consumption concluded that a consistent difference exists between them. Fuel consumption measured volumetrically was found to average three percent higher than when measured by the carbon balance method. This report presents another analysis of this question.

PB80-201007 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
An Investigation of the Fuel Economy Effects of Tire Related Parameters.
Technical rept.,
Glenn Thompson, and Marty Reineman. May 80, 35p EPA-AA-SDSB-80-9

A program was conducted on a test track to determine the fuel consumption effects of radial vs. bias-ply tires, two radial tires from different manufacturers, and increased tire pressure. The program was designed to eliminate ambient effects by running two identical test vehicles simultaneously and alternating the parameter of interest between the two vehicles. Five different tire types were used (including the original equipment manufacturer tires from the vehicles). This study demonstrated that radial tires were six percent more fuel efficient than bias-ply tires; the radial tires from one manufacturer were four percent more fuel efficient than radial tires from a different manufacturer; and radial tires inflated to 28 psig were three percent

more fuel efficient than radial tires inflated to 20 psig. This program also determined that laboratory measurements of rolling resistance are good predictors of track fuel consumption.

PB80-201304 PC **A05**/MF **A01**
Alabama Univ. in Huntsville. Kenneth E. Johnson Environmental and Energy Center.
The Effects of Automobile Inspections on Accident Rates.
Final rept.,
B. J. Schroer, and W. F. Peyton. 31 Aug 77, 85p UAH-202, DOT-HS-805-401
Contract DOT-HS-5-01056

The study was conducted to determine the effects the Alabama Auto Check automotive diagnostic inspection facility has had on the accident rate of Huntsville residents having accidents in Madison County, Alabama. A previous study indicated that the inspected vehicle was 12 percent less likely to be involved in an accident. The previous study observed the accident history of individual vehicles for 13 months and used one method of determining accident rate improvement. The present study on the other hand, observed the vehicles for 21 months and with the larger sample size used three independent methods of determining accident rate improvement.

PB80-201460 PC **A03**/MF **A01**
Lea (N. D.) and Associates, Inc., Washington, DC.
Proposed Analysis Methodology for Rail Car Propulsion System Selection.
Technical rept.,
W. Bamberg, and D. Eldredge. May 80, 50p UMTA-IT-06-0229-80-1
Contract DOT-UT-60069

This report proposes a rail car propulsion system selection methodology based on life cycle costing. The objective of the proposed methodology is to provide transit operators with a practical method of calculating propulsion system life cycle costs to be used in bid evaluation of different rail car propulsion and control system technologies. If life cycle costing is to become part of the car acquisition process, it is important that the methodology is known and accepted by the suppliers and purchasers. The analysis methodology as presented here is to some extent based on previously applied methods and includes results from new work performed for this project. In this report, recent railcar propulsion system procurement practices and other related information were reviewed, and discussions were held with propulsion system suppliers and various operating systems. Results of this research were used in the development of the propulsion system evaluation and selection methodology, and the structured application of life cycle costing.

PB80-201809 PC **A03**/MF **A01**
Pacific Environmental Services, Inc., Santa Monica, CA.
Evaluation of Motor Vehicle Emissions Inspection/Maintenance Programs for Michigan. Volume I. Executive Summary,
J. Gunderson, J. Randall, G. Pan, E. Vodonick, and V. Bhatia. 15 Oct 79, 30p EPA-905/2-79-003A
Contract EPA-68-02-2536
Prepared in cooperation with Systems Control, Inc., Anaheim, CA. Environmental Engineering Div.
See also Volume 2, PB80-201817.

The State of Michigan, pursuant to the Clean Air Act as amended (1977), is required to consider an Inspection/Maintenance (I/M) program for part or all the State because the five-county Detroit metropolitan area, at least, is expected to be unable to meet applicable air quality standards prior to the 1982 deadline. This study evaluates a range of possible I/M program configurations to assist in the identification of a short list of alternatives that would be appropriate in Michigan. The findings of this study are presented in two volumes. Volume I explores a broad range of I/M options.

PB80-201817 PC **A16**/MF **A01**
Pacific Environmental Services, Inc., Santa Monica, CA.
Evaluation of Motor Vehicle Emissions Inspection/Maintenance Programs for Michigan. Volume II,
J. Gunderson, J. Randall, G. Pan, E. Vodonick, and V. Bhatia. 15 Oct 79, 373p EPA-905/2-79-003B
Contract EPA-68-02-2536
See also Volume 1, PB80-201809. Prepared in cooperation with Systems Control, Inc., Anaheim, CA. Environmental Engineering Div.

The State of Michigan, pursuant to the Clean Air Act as amended (1977), is required to consider an Inspection/Maintenance (I/M) program for part or all the State because the five-county Detroit metropolitan area, at least, is expected to be unable to meet applicable air quality standards prior to the 1982 deadline. This study evaluates a range of possible I/M program configurations to assist in the identification of a short list of alternatives that would be appropriate in Michigan. The findings of this study are presented in two volumes. Volume II performs a comprehensive evaluation of costs and benefits for a matrix of 24 program configurations differentiated by administrative mode, inspection procedure and scope. As a result of the comparative analysis, a short list of candidate options is proposed for further study.

PB80-202153 PC **A08**/MF **A01**
Dynamic Science, Inc., Phoenix, AZ.
FMVSS 212, 219, 301 Testing of Electric Vehicles, Electra Van 1000, Electra Van 1000P.
Final rept. Jan 80,
Mark Pozzi. Mar 80, 162p 3042-80-067, DOT-HS-805 441
Contract DOT-HS-8-01942

This report presents the results of two electric vehicle-to-NHTSA Fixed Test Device head-on crash tests. These tests were conducted to determine if the vehicles would comply with the fuel spillage requirements of Federal Motor Vehicle Safety Standard (FMVSS) 301, Fuel System Integrity, the windshield retention requirements of FMVSS 212, and the windshield zone intrusion requirements of FMVSS 219. The standard fixed barrier was replaced by the 40-load cell NHTSA Fixed Test Device for both tests.

PB80-202286 PC **A13**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Automobile Multifunction Stalk Controls: Literature, Hardware and Human Factors Review.
Final rept. Jul-Dec 79,
Paul Green. Dec 79, 297p UM-HSRI-79-78

This report considers several topics related to the design of automobile multifunction stalkmounted controls. (The most common example is the turn signal lever, which when pulled or pushed, switches the headlamps from high to low beam, or vice versa.) In the first section a taxonomy for controls is presented. Four basic concepts--dedication, combination, directionality, and integration--are described, and examples of these concepts are included. In the literature section roughly 20 major documents concerned with stalk control design are described in detail and critically reviewed. Topics covered included: design stereotypes (hardware reviews), human factors analyses, problem surveys, accident data, driver preferences, driver performance, and previous literature reviews. Current regulations for automobile controls are described. The types of multifunction stalk controls in 1977-1979 model year cars are tabulated. Finally, based on the information described, limited design recommendations are offered.

PB80-202617 PC **A08**/MF **A01**
MGA Research Corp., Buffalo, NY.
Analysis of Frontal Impact Test Data - New Car Assessment Project.
Final rept. 15 Aug 79-29 Feb 80,
Patrick M. Miller, and Paul A. Rydzynski. Feb 80, 157p G9-005-V-1, DOT-HS-805 395
Contract DOT-HS-8-01936

Frontal barrier impact data developed by three different test contractors for the NHTSA 'New Car Assessment' project have been reviewed and analyzed. The test series involved 35 vehicles having a test weight range from 2180 to 5362 lbs. Most tests were at a nominal 35 MPH impact velocity. Instrumentation includes vehicle accelerometers, two fully restrained, adult Part 572 dummies in the front seat positions and a 6 year old child dummy restrained with a lap belt in the rear seat. Results were analyzed to assess occupant response characteristics in relation to measured injury criteria values. The major factor with head response, and to a lesser degree with the chest response, are the characteristics of the object struck. Several examples of vehicle occupant responses satisfying FMVSS 208 injury criteria were evident throughout most of the test weight range. Passenger compartment structures were viewed as providing reasonable integrity for the barrier impacts up to 35 MPH. However, this test likely imposes conditions near the structural limit for most vehicles.

PB80-202807 PC **A05**/MF **A01**
Texas State Dept. of Highways and Public Transportation, Austin.
Equipment Improvements for Removal of Traffic Markings by High-Temperature Burning with Excess Oxygen.
Final rept.,
Don Killgore. Jan 80, 97p DHT-1-9-78-511-F, FHWA/TS-80-208
Contract DOT-FH-11-8608

High-temperature burning with excess oxygen has proved to be a pavement marking removal system which allows a rapid flash burning of pavement markings with minimal motorist recognition and little or no pavement surface deterioration. This pavement marking removal system, however, does leave the burned residue (of the pavement marking) on the roadway surface. Procedures utilized and results of the optimization of the high-temperature burner system and burned residue removal procedures are discussed. Three burner head designs were evaluated in order to optimize the burner system. Burned residue removal procedures to include powered brushes, waterblast, and sand blast were evaluated. All equipment and procedures were evaluated in a field environment in order to provide a practical, readily available, economical, and viable system for pavement marking removal. This document is meant to serve those who wish to use this method of pavement marking removal.

PB80-202815 PC **A05**/MF **A01**
Opinion Research Corp., Princeton, NJ.
Automatic Safety Belt Systems Owner Usage and Attitudes in GM (General Motors) Chevettes and VW (Volkswagen) Rabbits.
Final rept. May 80,
Benjamin M. Phillips, and David M. Goodman. May 80, 96p 51495, DOT-HS-805 399
Contract DOT-HS-7-01736

The study was designed to: (1) evaluate the effectiveness of automatic restraint systems in increasing belt usage, and (2) determine owner attitudes toward the system. Information gathered from owners of vehicles with automatic systems will assist NHTSA in determining levels of acceptance, and problems or areas of resistance to these systems. Such information provides an 'early warning' of critical problem areas that need to be resolved before automatic restraint systems become standard equipment in all cars. Data collected are derived from 2,341 telephone interviews with owners of GM Chevettes and VW Rabbits. Findings indicate that the automatic restraint system with an operative starter-interlock is highly effective as a use-inducing system. There are, however, certain comfort and convenience related problems with automatic systems that need to be resolved. Information programs directed at dealers and the public should help to ensure that the mandate for automatic belt systems is successful.

PB80-203151 PC **A13**/MF **A01**
GCA Corp., Bedford, MA. GCA Technology Div.
Evaluation of Motor Vehicle Emissions Inspection and Maintenance Programs for Indiana.
Final rept.,
Donna L. Vlasak, Lee A. Coda, Theodore P. Midurski, Robert O. Phillips, and Nancy K. Roy. Oct 78, 296p GCA-TR-78-45-G(B), EPA-905/2-78-008
Sponsored in part by Indiana State Board of Health, Indianapolis.

Data reported for the State of Indiana indicate that certain National Ambient Air Quality Standards will

not be attained in all areas of the state by 1982, even if all reasonable available control technologies are applied. In view of this, it is likely that the state will request from U.S. EPA an extension of the compliance data beyond 1982. In order for this request to be considered, the state must, among other things, have adopted a firm schedule for implementing a motor vehicle inspection and maintenance (I/M) program in the highly urbanized nonattainment areas. Currently, the State of Indiana is undertaking planning studies for the implementation of an I/M program. As part of this initial effort, several alternative programs have been analyzed from the standpoint of costs, benefits, and other requirements. These analyses, which are reported herein, will provide the basis for the state to select one specific alternative that will eventually be implemented.

PB80-204035 PC **A02**/MF **A01**
Kinetic Research, Goleta, CA.
Effects of Recent Vehicle Design Changes on Safety Performance, Executive Summary.
Final rept. Oct 77-Mar 79,
D. Redmond, B. Schmitz, and K. Friedman. Mar 79, 7p DOT-HS-805 377
Contract DOT-HS-7-01759

Design changes in 1974-1977 model year passenger cars have been identified and a preliminary evaluation has been made of the safety effects of design changes inspired by fuel economy requirements. The 1977 General Motors full-size cars and the Volkswagen Rabbit were found to be the only significant design change vehicles. These vehicles do not demonstrate significantly higher risks of fatality in accidents than do other vehicles of similar weight or roominess. Little change is observed in the aggregate characteristics of the 1974-1977 vehicle fleets, although the effects of the 1977 General Motors downsizing are observable. Methodologies have been implemented for the identification of vehicle design changes, for the calculation of observed fatality rates by make and model, and for the projection of future fatality and injury experience based on perceived trends in vehicle design and sales. There are a number of recommendations for further investigation of the effects of vehicle design on safety and for extension of the work to include 1978 and 1979 model year cars, light trucks and vans.

PB80-204399 PC **A03**/MF **A01**
Volkswagenwerk A.G., Wolfsburg (Germany, F.R.). Research Div.
Data Base for Light-Weight Automotive Diesel Power Plants. Volume I: Executive Summary.
Final rept. 30 Jun 76-30 Jun 77,
B. Wiedemann, and R. Schmidt. Dec 79, 47p
DOT-TSC-NHTSA-79-62-1, DOT-HS-805 276
Contract DOT-TSC-1193
See also Volume 2, PB80-204407.

The effects on fuel economy, emissions, passenger car safety and other variables due to the installation of light-weight Diesel powerplants were studied. Experimental data was obtained on naturally aspirated and turbocharged Diesel engines installed in subcompact and compact passenger vehicles. The data includes fuel economy as a function of engine type and horsepower, as a function of vehicle inertia weight and as a function of regulated emission constraints. Unregulated emissions have been characterized during the course of the work. The compatibility of the Diesel engine studied with passenger car structures incorporating advanced frontal crashworthiness capabilities was also verified. Volume I, the Executive Summary, presents a summary of the data obtained and a review of the important conclusions.

PB80-204407 PC **A22**/MF **A01**
Volkswagenwerk A.G., Wolfsburg (Germany, F.R.). Research Div.
Data Base for Light-Weight Automotive Diesel Power Plants. Volume II: Discussion and Results.
Final rept. 30 Jun 76-30 Jul 77,
B. Wiedemann, and R. Schmidt. Dec 79, 505p
DOT-TSC-NHTSA-79-62-2, DOT-HS-805 277
Contract DOT-TSC-1193
See also Volume 1, PB80-204399, and Volume 3, PB80-204415.

The effects on fuel economy, emissions, passenger car safety and other variables due to the installation of light-weight Diesel powerplants were studied. Experimental data was obtained on naturally aspirated and turbocharged Diesel engines installed in subcompact and compact passenger vehicles. The data includes fuel economy as a function of engine type and horsepower, as a function of vehicle inertia weight and as a function of regulated emission constraints. Unregulated emissions have been characterized during the course of the work. The compatibility of the Diesel engine studied with passenger car structures incorporating advanced frontal crashworthiness capabilities was also verified. Volume II, the main body of the report, provides a discussion of the fuel economy and emissions obtained, a description of the engine/vehicle systems tested and the results of factory driveability tests.

PB80-204415 PC **A10**/MF **A01**
Volkswagenwerk A.G., Wolfsburg (Germany, F.R.) Research Div.
Data Base for Light-Weight Automotive Diesel Power Plants. Volume III: Miscellaneous Data.
Final rept. 30 Jun 76-30 Jul 77,
B. Wiedemann, and R. Schmidt. Dec 79, 205p
DOT-TSC-NHTSA-79-62-3, DOT-HS-805 278
Contract DOT-TSC-1193
See also Volume 2, PB80-204407.

The effects of fuel economy, emissions, passenger car safety and other variables due to the installation of light-weight Diesel powerplants were studied. Experimental data was obtained on naturally aspirated and turbocharged Diesel engines installed in subcompact and compact passenger vehicles. The data includes fuel economy as a function of engine type and horsepower, as a function of vehicle inertia weight and as a function of regulated emission constraints. Unregulated emissions have been characterized during the course of the work. The compatibility of the Diesel engine studied with passenger car structures incorporating advanced frontal crashworthiness capabilities was also verified. Volume III, the appendixes, presents miscellaneous data used during the program.

PB80-204878 PC **A04**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Summary of Capital and Operations and Maintenance Cost Experience of Automated Guideway Transit Systems. Costs and Trends for the Period 1976-1979. Supplement II.
Summary cost rept.,
Thomas F. Comparato, M. E. von Rosenvinge, and D. C. Kendall. Mar 80, 74p DOT/TSC/UMTA-80-19, UMTA-MA-06-0069-80-1
See also Supplement 1, PB80-146483.

This report summarizes O&M cost experience and trends for the following AGT systems for the period 1976-1979: AIRTRANS, Sea-Tac, Tampa, Disneyworld (WEDway), and Morgantown (O&M data on the Morgantown system is reported through 1978). Capital cost data is reviewed on Morgantown Phase I, AIRTRANS, Tampa, Sea-Tac, Miami, Busch Gardens, Disneyworld, King's Dominion, and Fairlane. New capital cost data has been obtained from the Atlanta and Orlando Airports and the Minnesota Zoological Gardens. In addition to presenting capital and operating and maintenance costs and trends, this report includes analysis of the factors influencing these costs. A section on the differences between urban and non-urban settings of AGT systems has also been included and shows how the costs of existing non-urban systems might relate to a system in an urban deployment in terms of site conditions and site requirements.

PB80-204928 PC **A04**/MF **A01**
De Lorean Motor Co., Troy, MI. Research and Engineering Div.
Cost Evaluation for Nine Federal Motor Vehicle Safety Standards. Task IX. Side Door Strength, Identification and Cost Evaluation of Design and Manufacturing Changes.
Final rept. Jul-Sep 79,
M. R. Harvey, and C. E. Eckel. Nov 79, 54p
DOT-HS-805-450
Contract DOT-HS-8-02015

The contractor reviewed the price evaluation of FMVSS 214 performed under Contract No. DOT-HS-7-01767 and selected fourteen commensurate 1979 models and door beams and body pillars (if necessary). The components required were purchased and a weight and consumer price was obtained by the application and automotive component processing. Variable cost was determined by the application of 1979 model year production data. The consumer price was determined by extending the variable cost by the macro-analysis method based on data from 1978. The changes were categorized either by (1) improvement by engineering and/or manufacturing changes or (2) by sizing changes. Four 1979 models did not change, four were redesigned for engineering and manufacturing reasons, and four were downsized and two were upsized.

PB80-210230 PC **A12**/MF **A01**
Falcon Research and Development Co., Buffalo, NY.
Study of Automotive Emission Control Technology: Emissions from Future In-Use Vehicles, 1980-1985.
Interim rept. no. 6.
1 Jul 80, 255p AQ-7243-2F
Contract 2-AQ-7243
Prepared in cooperation with Energy and Environmental Analysis, Inc., Arlington, VA.

This is an interim report in a study to evaluate the factors which cause vehicles to fail to meet emission standards in-use, determine how adequately the EPA motor vehicle emission factors characterize actual in-use emission levels of vehicles, and determine appropriate adjustments, if any, that should be made to the EPA emission factors. This report provides an overview of the emission control technologies that will be used on 1980 - 1985 vehicles, an analysis of the types of failures and failure rates emission control system components will most probably experience, and projects the in-use emission levels of these vehicles under several scenarios.

UCRL-15138 PC **A03**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Mechanical Energy Storage Technology for Transportation Applications Project Plan.
30 Nov 79, 50p
Contract W-7405-ENG-48

The general objective of the project is to provide safe and economical flywheel systems for regenerative braking and load leveling in electric and other hybrid vehicles by FY 1984. For eventual utilization in vehicles, the design of FES technology must be both functional and marketable. The use of FES regenerative braking and load leveling systems will upgrade the performance of electric and hybrid vehicles and improve the fuel economy of heat engine/flywheel vehicles to a level required for acceptable market penetration. However, the extent to which market acceptance depends on performance has not been determined. (ERA citation 05:005947)

13H. Industrial Processes

CEA-CONF-4316 MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Detection and Location of Artificial Defects During Submerged-Arc Welding.
M. Asty. 1978, 1p CONF-7804158-1
In French.Congress of the National Bureau of Standards, Gaithersburg, MD, USA, 17 Apr 1978. U.S. Sales Only. Microfiche copies only.

Using the acoustic emission source location system LOCAMAT 32 developed at CEA (France), artificial defects (flaws) were successfully detected and located during submerged-arc welding of A533B steel plates. More than 1000 events per pass were detected by each group of 4 sensors. The significant events were sorted out, considering their origin in time and space. (Atomindex citation 10:473737)

PAT-APPL-6-011 018 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Fiber Optics Welder.
Patent Application,

R. W. Higgins, and R. E. Robichaud. Filed 9 Feb 79, 17p
Contract EY-76-C-08-1183
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A system is described for welding fiber optic waveguides together. The ends of the two fibers to be joined together are accurately, collinearly aligned in a vertical orientation and subjected to a controlled, diffuse arc to effect welding and thermal conditioning. A front-surfaced mirror mounted at a 45 exp 0 angle to the optical axis of a stereomicroscope mounted for viewing the junction of the ends provides two orthogonal views of the interface during the alignment operation. (ERA citation 05:029480)

PAT-APPL-6-039 985 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Small Diameter, Deep Bore Optical Inspection System.
Patent Application,
D. E. Lord, R. R. Petrini, and G. W. Carter. Filed 17 May 79, 15p
Contract W-7405-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved rod optic system for inspecting small diameter, deep bores is described. The system consists of a rod optic system utilizing a curved mirror at the end of the rod lens such that the optical path through the system is bent 90 exp 0 to minimize optical distortion in examing the sides of a curved bore. The system is particularly useful in the examination of small bores for corrosion, and is capable if examing 1/16 inch diameter and up to 4-inch deep drill holes, for example. The positioning of the curved mirror allows simultaneous viewing from shallow and righ angle points of observation of the same artifact (such as corrosion) in the bore hole. The improved rod optic system may be used for direct eye sighting, or in combination with a still camera or a low-light television monitor; particularly low-light color television. (ERA citation 05:029428)

PAT-APPL-6-076 528 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Method of Fabricating Thin-Walled Articles of Tungsten-Nickel-Iron Alloy.
Patent Application,
V. M. Hovis, Jr., and W. G. Northcutt, Jr. Filed 18 Sep 79, 12p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to a method for fabricating thin-walled high-density structures of tungsten-nickel-iron alloys. A powdered blend of the selected alloy constituents is plasma sprayed onto a mandrel having the desired article configuration. The sprayed deposit is removed from the mandrel and subjected to liquid phase sintering to provide the alloyed structure. The formation of the thin-walled structure by plasma spraying significantly reduces shrinkage, and cracking while increasing physical properties of the structure over that obtainable by employing previously known powder metallurgical procedures. (ERA citation 05:029278)

PATENT-4 183 055
Not available NTIS
Department of Energy, Washington, DC.
Beam/Seam Alignment Control for Electron Beam Welding.
Patent,
J. H. Burkhardt, J. J. Henry, and C. M. Davenport. Filed 24 Aug 78, patented 8 Jan 80, 6p PAT-APPL-936 458
Supersedes PAT-APPL-936 458-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a dynamic beam/seam alignment control system for electron beam welds utilizing video apparatus. The system includes automatic control of workpiece illumination, near infrared illumination of the workpiece to limit the range of illumination and camera sensitivity adjustment, curve fitting of seam position data to obtain an accurate measure of beam/seam alignment, and automatic beam detection and calculation of the threshold beam level from the peak beam level of the preceding video line to locate the beam or seam edges. 4 claims. (ERA citation 05:029563)

PB80-202799 PC **A07**/MF **A01**
IIT Research Inst., Chicago, IL.
Technical-Economic Feasibility Study of Numerical Control Machining Applied to Molds for Shoe Bottoms.
Final rept. 8 May-6 Oct 79.
Jul 80, 127p EDA-80-0101
Grant EDA-99-26-09881-10

The purpose of the study is to determine the technical and economic feasibility of applying numberical control (NC) machining technology to the manufacture of injection molds for footwear bottoms. The goal is to improve the competitive position for the U.S. footwear industry. This is dependent on achieving two primary objectives -- reduced production time and reduced production cost. The footwear industry must react to seasonal/style changes. Numerical control machining with its flexible manufacturing control system has been proven to be a very cost-effective tool where production quantities are small, precision requirements are high, and numerous minor dimensional and configuration changes in the product are expected. Applying numerical control machining techniques to the fabrication of plastic injection mold tooling is not in and of itself unique.

SAN-0113/35-1 PC **A02**/MF **A01**
University of Southern California, Los Angeles.
Evaporation Driven Liquid Sintering. Progress Report.
J. M. Whelan. Aug 79, 13p
Contract EY-76-S-03-0113-035

Reaction driven liquid sintering mechanisms with MgO-LiF were studied including the effects of varying the LiF particle size distribution within the cold pressed compacts, microstructural and bulk property differences, and the time rate changes in the mechanical properties during permeation annealing. (ERA citation 05:008894)

UCRL-82367 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Application of Shallow Solar Ponds for Industrial Process Heat: Case Histories.
A. B. Casamajor. 4 May 79, 13p CONF-790541-57
Contract W-7405-ENG-48
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

The shallow-solar-pond collector system developed by the Lawrence Livermore Laboratory is approaching commercialization. Three prototype or demonstration projects, Sohio Petroleum Company, Sweet Sue Kitchens, and Fort Benning, are described. A critique of each project points out the significant factors that affect the individual projects and shallow-solar pond technology in general. Particular attention is drawn to problems encountered and solutions proposed. Finally, possible marketing organization and strategies are discussed. (ERA citation 05:004400)

Y/DX-076 PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Part Support Studies for Diamond Machining Mirrors.
S. C. Robinson, H. L. Gerth, and J. E. Stoneking. 1979, 8p CONF-791121-2
Contract W-7405-ENG-26
Workshop on optical fabrication and testing, Tucson, AZ, USA, 5 Nov 1979.

Four techniques were studied in an effort to reduce contour errors generated by the method for mounting mirrors to a spindle. It was determined that the potting-in-rubber and vacuum-fixturing techniques were acceptable if great care was taken in preparing the part, the fixture, and in mounting the part. The edge-clamp technique proved unacceptable in its present form, and time constraints prevented further investigation. The three-point, bolted-support technique produced the best results with the least preparation; however, proper mounting-bolt torque and spindle speed are critical to success. This latter technique has been shown to be acceptable for both center turning and off-axis machining. Figure accuracy levels in the range of 250 to 500 nm (10 to 20 mu in) peak-to-valley have been obtained using this technique. (ERA citation 05:004815)

Y/DX-81 PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Use of Tangent Mounts for Diamond Machining Optics.
J. B. Arnold, P. J. Steger, and R. C. Yoder. 19 Oct 79, 6p
Contract W-7405-ENG-26

A fundamental requirement for precision diamond machining is the use of a proper part support technique. Various fixturing techniques have been used during diamond machining to minimize or duplicate the strain that the part will be subjected to during use. These techniques include: three-point support, one-point support, potting, collet chucking, and vacuum chucking. During the production of a 15-inch-diameter reflaxicon, its two components, a ring axicon and center axicon, were assembled in tangent mounts and supported using a vacuum chuck. The tangent mount reduced the fixturing strain by increasing the distance the strain must propagate through, and by increasing the rigidity of each component relative to the spindle fixture. Non-flatness error of approximately 40 mu in (1 mu m) in the support flange of the tangent mount resulted in less than 2 mu in (.05 mu m) distortion in the optical surface. (ERA citation 05:009035)

13I. Machinery and Tools

AD-A086 498/3 PC **A05**/MF **A01**
Army Armament Research and Development Command Dover NJ Management Information Systems Directorate
The SHAFT Book (Design Charts for Torsional Properties of Non-Circular Shafts).
Users' manual,
Robert I. Isakower. Mar 80, 95p Rept no. MISD-UM-80-5

Design charts and tables have been developed for the elastic torsional stress analyses of free prismatic shafts, splines and spring bars with virtually all commonly encountered cross sections. Circular shafts with rectangular and circular keyways, external splines, and milled flats along with rectangular and X-shaped torsion bars are presented. A computer program was developed at the U.S. Army ARRADCOM, Dover, N.J. site which provides a finite difference solution to the governing (POISSON's) partial differential equation which defines the stress functions for solid and hollow shafts with generalized contours. Using the stress function solution for the various shapes and Prandtl's membrane analogy, the author is able to produce dimensionless design charts (and tables) for transmitted torque and maximum shearing stress. The design data have been normalized for a unit dimension of the cross section (radius or length) and are provided in this report for solid shapes. The eleven solid shapes presented, along with the classical circular cross section solution, provides the means for analyzing 144 combinations of hollow shafts with various outer and inner contours. Hollow shafts may be analyzed by using the computer program directly or by using the solid shape charts in this report and the principles of superposition based on the concept of parallel shafts. (Author)

AD-A086 859/6 PC **A03**/MF **A01**
Naval Ocean Systems Center San Diego CA
Remote Unmanned Work System Primary Cable Termination and Potting Procedures.
Final rept. 1978-1980,
Robert S. Stark. Jun 80, 39p Rept no. NOSC/TD-350

This procedure for potting and terminating the strength and electrical portions of the primary cable of the Remote Unmanned Work System (RUWS) are discussed. Also included are lists of tools and materials to be used in the process. (Author)

N80-27697/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Stresses and Deformations in Elliptical Contacts.
B. J. Hamrock. 1980, 19p NASA-TM-81535, E-488
Lecture Presented at Lulea Univ., Sweden, 24 Jul. - 16 Aug. 1980.

Topics presented deal with defining conformal and nonconformal surfaces, curvature sum and difference, and surface and subsurface stresses in elliptical contacts. Load-deflection relationships for nonconformal contacts are developed. The deformation within the contact is, among other things, a function of the ellipticity parameter and elliptic integrals of the first and second kinds. Simplified expressions that allow quick calculations of the deformation to be made simply from a knowledge of the applied load, the material properties, and the geometry of the contacting elements are presented.

N80-27698/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Fully Flooded Elastohydrodynamic Lubricated Elliptical Contacts.
B. J. Hamrock. 1980, 27p NASA-TM-81543, E-497
Lecture Presented at Lulea Univ., Sweden, 24 Jul. - 16 Aug. 1980.

Emphasis is on fully flooded, elastohydrodynamic lubricated, elliptical contacts. A fully flooded conjunction is one in which the film thickness is not significantly changed when the amount of lubricant is increased. A brief description of the relevant equations used in the elastohydrodynamic lubrication of elliptical contacts is given. The most important practical aspect of the elastohydrodynamic theory is the determination of the minimum film thickness within the contact. The maintenance of a fluid film of adequate magnitude is an essential feature of the correct operation of lubricated machine elements. The results presented show the influence of contact geometry on minimum film thickness as expressed by the ellipticity parameter and the dimensionless speed, load, and materials parameters. Film thickness equations are developed for materials of high elastic modulus, such as metal, and for materials of low elastic modulus, such as rubber. In addition to the film thickness equations that are developed, plots of pressure and film thickness are presented. These theoretical solutions for film thickness have all the essential features of previously reported experimental observations based on optical interferometry. Correlation between theory and experiments is also presented.

N80-27699/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Starved Elastohydrodynamic Lubricated Elliptical Contacts.
B. J. Hamrock. 1980, 23p NASA-TM-81549, E-507
Lecture Presented at Lulea Univ., Sweden, 24 Jul. - 16 Aug. 1980.

A theoretical study of the influence of lubricant starvation on film thickness and pressure in hard and soft elliptical elastohydrodynamic contacts is presented. From the results for both hard and soft EHL contacts a simple and important dimensionless inlet boundary distance is specified. This inlet boundary defines whether a fully flooded or a starved condition exists in the contact. Furthermore it is found that the film thickness for a starved condition could be written in dimensionless terms as a function of the inlet distance parameter and the film thickness for a fully flooded condition. Contour plots of pressure and film thickness in and around the contact are shown for fully flooded and starved conditions. The theoretical findings are compared directly with results obtained experimentally.

PAT-APPL-6-028 742 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Shuttleless Toroid Winder.
Patent Application,
C. W. Lindenmeyer. Filed 10 Apr 79, 28p
Contract E(49-8)-3000
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A lower support receives a toroid at a winding station with the axis of the toroid aligned with a slot in the support. An upper guide member applies an axial force to hold the toroid against the lower support. A pair of movable jaws carried by an indexing mechanism engage the outer surface of the toroid to apply a radial holding force. While the toroid is thus held, a wire is placed axially through the toroid, assisted by a funnel-shaped surface in the upper guide mamber, and is drawn tight about the toroid by a pair of cooperating draw rollers. When operated in the full cycle mode, the operator then actuates a switch which energizes a power drive to release the axial clamp and to drive the indexing mechanism and the jaws to rotate the toroid about its axis. At the same time, the wire is ejected from the draw rollers beneath the toroid so that the operator may grasp it to form another loop. When the toroid is fully indexed, the jaws release it, and the upper guide member is returned to clamp the toroid axially while the indexing mechanism is returned to its starting position. The apparatus may also be operated in a momentary contact mode in which the mechanism is driven only for the time a switch is actuated. (ERA citation 05:029425)

PATENT-4 162 593
Not available NTIS
Department of Energy, Washington, DC.
Tool Holder for Preparation and Inspection of a Radiused Edge Cutting Tool.
Patent,
C. Asmanes. Filed 28 Feb 78, patented 31 Jul 79, 4p PAT-APPL-881 965
Supersedes PAT-APPL-881 965-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A tool holding fixture is provided for removably holding a radiused edge cutting tool in a tool edge lapping apparatus. The fixture allows the operator to preset the lapping radius and angle before the tool holder is placed in the fixture and the holder may be removed from the lapping apparatus to inspect the tool and simply replaced in the fixture to continue lapping in accordance with a precise alignment without realignment of the tool relative to the lap. The tool holder includes a pair of self aligning bearings in the form of precision formed steel balls connected together by a rigid shaft. The tool is held by an arm extending from the shaft and the balls set is fixed position bearing cups and the holder is oscillated back and forth about a fixed axis of rotation to lap the tool radius by means of a reversibly driven belt-pulley arrangement coupled to the shaft between the bearings. To temporarily remove the holder, the drive belt is slipped over the rearward end of the holder and the holder is lifted out of the bearing cups. 4 claims. (ERA citation 05:029422)

PATENT-4 172 391
Not available NTIS
Department of Energy, Washington, DC.
Drill Drive Mechanism.
Patent,
M. O. Dressel. Filed 9 Sep 77, patented 30 Oct 79, 8p PAT-APPL-831 727
Supersedes PAT-APPL-831 727-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A drill drive mechanism is especially adapted to provide both rotational drive and axial feed for a drill of substantial diameter such as may be used for drilling holes for roof bolts in mine shafts. The drill shaft is made with a helical pattern of scroll-like projections on its surface for removal of cuttings. The drill drive mechanism includes a plurality of sprockets carrying two chains of drive links which are arranged to interlock around the drill shaft with each drive link having depressions which mate with the scroll-like projections. As the chain links move upwardly or downwardly the surfaces of the depressions in the links mate with the scroll projections to move the shaft axially. Tangs on the drive links mate with notch surfaces between scroll projections to provide a means for rotating the shaft. Projections on the drive links mate together at the center to hold the drive links tightly around the drill shaft. The entire chain drive mechanism is rotated around the drill shaft axis by means of a hydraulic motor and gear drive to cause rotation of the drill shaft. This gear drive also connects with a differential gearset which is interconnected with a second gear. A second motor is connected to the spider shaft of the different gearset to produce differential movement (speeds) at the output gears of the differential gearset. This differential in speed is utilized to drive said second gear at a speed different from the speed of said gear drive, this speed differential being utilized to drive said sprockets for axial movement of said drill shaft. 11 claims. (ERA citation 05:029461)

PATENT-4 172 398
Not available NTIS
Department of Energy, Washington, DC.
Preset Pivotal Tool Holder.
Patent,
C. Asmanes. Filed 28 Feb 78, patented 30 Oct 79, 4p PAT-APPL-881 966
Supersedes PAT-APPL-881 966-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A tool fixture is provided for precise pre-alignment of a radiused edge cutting tool in a tool holder relative to a fixed reference pivot point established on said holder about which the tool holder may be selectively pivoted relative to the fixture base member to change the contact point of the tool cutting edge with a workpiece while maintaining the precise same tool cutting radius relative to the reference pivot point. 2 claims. (ERA citation 05:029420)

PNL-SA-6870(Rev.) PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Description of a Unique Machine Tool Permitting Achievement of < 15-A Rms Diamond-Turned Surfaces.
D. M. Miller, G. H. Hauver, J. N. Culverhouse, and E. N. Greenwell. 1980, 12p
Contract EY-76-C-06-1830

A new machine tool now in the final stages of development at the Pacific Northwest Laboratory uses a unique tool motion to produce diamond-turned surfaces of exceptionally high quality. The cutting tool is programmed to move in 4-nm increments along two axes: an X axis and an Omega axis. Exceptionally stiff and accurate control of the tool is possible with this Omega-X system. Copper surfaces of revolution have been produced with a 12.3-A rms surface finish and a contour accuracy of 75 nm. In conjunction with a unique, thermally stabilized air bearing spindle and machine calibration equipment, the Omega-X system permits a significant advance in the fabrication of optical-quality surfaces for use with the visible spectrum. (ERA citation 05:010446)

SAND-79-8060 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Programmable Two-Axis Remote Positioner.
J. Hopwood, and A. Turner. Nov 79, 41p
Contract EY-76-C-04-0789

A two-axis mechanical positioner with an electronic controller has been developed for remote control of the wire feed in electron-beam cold-wire welding operations. Control is accomplished through regulation of the rotation and direction of high-speed stepping motors attached to each stage of a two-axis fixture which holds the wire-feed mechanism. The design features manual operation, programmable incremental movement toward and away from the fillet, and programmable wire feed rate. Although developed to fill a specific need for welding operations within a vacuum, it can be considered for use in other applications requiring precise positioning from a remote location. This document details the controls, operation, cir-

cuitry, and mechanical hardware. (ERA citation 05:004804)

UCRL-83200 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Machine Tool Task Force: An International Survey to Characterize the State of the Art of Machine Tools.
G. P. Sutton. 1979, 12p CONF-790932-1
Contract W-7405-ENG-48
National Science Foundation grantee's conference on production research and technology, Ithaca, NY, USA, 25 Sep 1979.

The main objectives of the two-and-one-half year, multidisciplined, international survey are to characterize the state of the art of machine tool technology, identify promising future directions of this technology for the purpose of improving manufacturing productivity and reducing the cost of machined products, and to disseminate the documented findings to both the government and industry. (ERA citation 04:055350)

13J. Marine Engineering

AD-A086 294/6 PC **A03**/MF **A01**
Michigan Univ Ann Arbor Dept of Naval Architecture and Marine Engineering
A Contribution to Flow-Separation Problem in Unsteady Motion of a Body.
Final rept.,
Yoji Himeno. Jul 79, 46p Rept no. 220
Contract N00014-79-C-0244

Roll motion is the least predictable of ship motions, largely because of viscosity effects, which in turn causes flow separations to occur. As a result of these phenomena, roll damping is often highly nonlinear. It is best estimated in the present state of the art by strictly empirical methods. In this report, several relevant flow-separation problems are studied from a fundamental point of view. These are divided generally into two categories: (1) boundary-layer separation and (2) sharp-edge separation. In both cases, starting motion and oscillatory motion are considered separately. Emphasis is placed on rather simple methods of calculations. Results are compared with experiments and/or more detailed calculation methods wherever such are available. Finally, a procedure is proposed (but not carried out) for treating the formation of vortex sheets by a translating rolling ship hull. (Author)

AD-A086 461/1 PC **A02**/MF **A01**
Scripps Institution of Oceanography La Jolla CA Marine Physical Lab
A Descriptive Summary of the RUM-ORB Sea Floor Work System.
Technical Memo.,
Daniel K. Gibson. 17 Aug 70, 8p Rept nos. MPL-U-66/70, MPL-TM-217
Contract N00014-69-A-0200

RUM is an unmanned track laying, bottom crawling sea floor work vehicle. It is connected to the surface support ship by a single coaxial cable, through which all vehicle power, control and instrumentation telemetry and television video is transmitted. The cable also serves as the strain member for lowering RUM to the sea floor. RUM is mobile yet firmly coupled to the bottom for stability in the performance of work tasks.

AD-A086 482/7 PC **A07**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Vibrations of a Marine Propeller Operating in a Nonuniform Inflow.
Research and development rept.,
James Emmert Brooks. Apr 80, 140p Rept no. DTNSRDC-80/056

The effect of blade vibration on the unsteady forces developed by an elastic marine propeller is investigated for a controlled laboratory situation. The study involves the development of a theory for a flexible propeller operating in a spatially nonuniform inflow velocity field and a series of experimental tests. Measurements of unsteady propeller forces in a 24-inch water tunnel are presented for two model propellers whose fundamental resonance frequencies are excited by a nonuniform inflow field. Measured unsteady thrust and torque, presented as a function of excitation frequency, show distinctly different elastic effects--one propeller demonstrates a large force amplification near its resonance frequency while the other did not. The simple theoretical model explains the difference as being due to the differing amounts of induced hydrodynamic damping; there is a large hydrodynamic damping in one case and a small amount in the other case. Another result of the study is that blade vibration can significantly reduce the unsteady forces transmitted to the propeller shaft over a certain range of excitation frequencies. Calculated forces are in general agreement with the experimental measurements. (Author)

AD-A086 598/0 PC **A04**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Wind Tunnel Development of a Funnel for Ships 63-64 for the Broken Hill Proprietary Company Limited.
Technical memo.,
T. H. Trimble. Nov 79, 55p Rept no. ARL/AERO-TM-317

The effectiveness of different configurations of funnel for SHIPS 63-64 was compared in a low speed wind tunnel investigation, at two engine power settings representing operations at light and full draft displacements. The recommended configuration combined an elliptic envelope, or funnel casing, with a horizontal crown at a height of 6 metres above the compass bridge deckhead, enclosing the main gas turbine exhaust pipe which extended 1-1/2 metres above the crown of the casing. (Author)

AD-A086 640/0 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
Computer Aided Geometrical Variation and Fairing of Ship Hull Forms.
Master's thesis,
Frederick Robertson Haberlandt. May 78, 159p

Two distinct aspects of computer aided ship design are addressed in this thesis. First, a geometrical hull form modification technique employing the longitudinal repositioning of sections is developed. The second aspect deals with the mathematical representation of lines and line fairing. Before this is done however, justification is presented for utilizing third degree polynomials as an approximation to the spline curves of the naval architect. The results obtained indicate that a fairing procedure based on a least squares curve fitting criteria and a lines representation procedure based on parametric cubic equations could be adapted to generate faired hull forms from the roughest preliminary hull design. Additionally, the hull form modification technique could be programmed so as to produce the designs with desired values of C sub p, LCB, C sub w and LCF from a basis design of similar type. (Author)

AD-A086 642/6 MF **A01**
Naval Postgraduate School Monterey CA
The Effects of Wave Spreading on the Exciting Forces on a Tension Leg Platform.
Master's thesis,
Rolf A. Dietrich. May 79, 73p
Availability: Microfiche copies only.

Oil exploration in water deeper than 1000 feet has motivated the development of drilling platforms with dynamic responses superior to those of the conventional jacket structures. One of the most promising of these is the tension leg platform (TLP), a semi-submersible platform held in place by tension members connected to the ocean bottom. This thesis evaluates the wave force transfer function for the TLP in heave, pitch, and roll motions. This is accomplished by assuming the transfer function for a single leg and then extending that result to include the effect of phase differences between forces on multiple legs, including the effect of wave spreading. Cosine squared directional wave spreading is discussed and then dismissed in favor of a Gaussian distribution of wave direction. Using the Gaussian distribution it is shown that when the wave spreading has a standard deviation greater than 0.5 radian the exciting force transfer functions in heave, pitch, and roll converge rapidly to that computed for seas uniformly distributed over all incidence angles. (Author)

AD-A086 666/5 PC **A04**/MF **A01**
Naval Academy Annapolis MD Div of Engineering and Weapons
A Search for the Best Method to Rig a Racing Shell.
Charles E. Everett, Jr. 14 May 80, 63p Rept no. USNA/EW-9-80

In today's crew competition one may find different rigging configurations used by the various crew teams. There must be some logical reasoning behind one team using one type of rigging over another one. For the most part, coaches tend to go with personal preferences. This research is designed to find some physical facts as to whether one type of rigging is better for a shell than another. Three different riggings were tested: (1) conventional, port-starboard, (2) tandem at 7 and 6 seats, and (3) tandem at 4 and 5 seats. The shell was equipped with accelerometers which recorded the transverse accelerations. From the data collected plots were made to illustrate the deflections that occurred with each rigging configuration. The results proved that the tandem riggings are more favorable in producing a straighter course for the shell to travel. Since, to my knowledge, this is the first time any test of this type has been conducted, the initial theory that the moments imparted at the riggers affect the overall course of the shell is proved valid. (Author)

AD-A086 720/0 PC **A14**/MF **A01**
Wyle Labs Huntsville AL Scientific Services and Systems Group
Conceptual Design Study for Shipboard Environmental Simulation Facility (SESF).
Final rept. 1 Jan-30 Jun 80,
W. Blanton, K. Cappel, L. Johnson, F. Leslie, and M. Montroll. 30 Jun 80, 303p Rept no. WR-80-12
Contract N60921-80-C-0035

This report documents the conceptual design of a shipboard environmental simulation facility to be used by the Shipboard Nuclear Weapons Security Program to develop and qualify physical security systems for shipboard use. Descriptions of the environments to be simulated; means of simulation; building; and scenario control system design concepts are contained in the report. (Author)

AD-A086 854/7 PC **A05**/MF **A01**
EG and G Washington Analytical Services Center Inc Rockville MD
Mooring Dynamics: Computer Models and Experiments at a Sixty Foot Scale.
Technical rept.
David B. Dillon. Jul 80, 95p Rept no. EG/G-TR-4999-0004
Contract N00014-78-C-0273

The U.S. Navy Civil Engineering Laboratory is conducting a series of dynamic cable experiments in order to evaluate computer models of cable systems used in the ocean. The results of an experiment using 60 foot cables are compared to two computer simulations in this report. Other experiments at scales of six feet and 2,500 feet have been performed. Three cases from the experiment conducted in the hydroballistics tank of the Naval Surface Weapons Center in 1976 are compared to the SNAPLOAD and SEADYN computer models. Two of the runs simulate the anchor-last deployment of a mooring; the third shows the relaxation of a mooring displaced laterally, then released. The quality of the experimental data is evaluated by comparing each case to the static, elastic catenary equations at the start and finish of each run. The measured positions of points along the static catenaries are found typically to agree with the catenary calculations within 1 to 2 percent of the cable length. Tension measured at the fixed end typically agrees with the calculated value within about 12 percent.

AD-A086 873/7 PC **A02**/MF **A01**
California Inst of Tech Pasadena Div of Engineering and Applied Science

Hydrodynamics of Turbomachines.
Final rept.,
A. J. Acosta. May 80, 7p
Contracts N00014-67-A-0094-0021, N00014-76-C-0156

The present concerns have been primarily with applications to flows of liquids in turbomachines rather than gases. Each medium has its own special problems in addition to the common basis in fluid mechanics. Liquid flows in particular are subject to cavitation when the pressure falls below the vapor pressure. Cavitation is a major element in many applications of naval hydrodynamics. Here the 'turbomachine' is the propulsion system and cavitation on the components of this system, primarily the rotor or propeller, may cause intense noise, if the extent of cavitation is small, significant material erosion if there is a somewhat larger amount of cavitation, or a major performance change (loss of thrust, efficiency, etc.) when there is a large extent of cavitation. The establishment of conditions for the onset of cavitation is then an important feature in almost all naval hydrodynamic applications. Just this particular problem has been the source of much recent effort in cavitation inception research and has been a feature of some of the present work herein.

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

FEI-804 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Distribution of Liquid Between Flow Core and a Film in Annular Dispersed Flow Regime in a Tube.
E. A. Boltenko, V. V. Pashichev, O. L. Peskov, and R. S. Pomet'ko. 1978, 12p
In Russian.
U.S. Sales Only.

The results of experimental investigation into the liquid flow rate in a film in the region of the dispersed annular regime of low of freon-12 are presented The liquid film has been sampled with the aid of a slot chamber. The experiments have been carried out on tubes with an inside diameter of 14.6 and 8 mm with uniform heat release along the length at pressures of 10.8-15.8 atm. abs. The mass rate being varied form 260 to 1500 kg/m exp 2 s. It is shown that the liquid flow rate in the film reduces as the vapour content increases and practically approaches zero at the place of beginning of the exchange crisis. A strong influence of the thermal flow on the distribution of the liquid between the flow kernel and the near-wall liquid film is revealed. (Atomindex citation 10:452505)

PATENT-4 174 728
Not available NTIS
Department of Energy, Washington, DC.
Sliding-Gate Valve.
Patent,
G. B. Usnick, G. T. Ward, H. O. Blair, J. W. Roberts, and T. N. Warner. Filed 14 Nov 77, patented 20 Nov 79, 8p PAT-APPL-851 330 Supersedes PAT-APPL-851 330-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention is a novel valve of the slidable-gate type. The valve is designed especially for long-term use with highly abrasive slurries. The sealing surfaces of the gate are shielded by the valve seats when the valve is fully open or closed, and the gate-to-seat clearance is swept with an inflowing purge gas while the gate is in transit. A preferred form of the valve includes an annular valve body containing an annular seat assembly defining a flow channel. The seat assembly comprises a first seat ring which is slidably and sealably mounted in the body, and a second seat ring which is tightly fitted in the body. These rings cooperatively define an annular gap which, together with passages in the valve body, forms a guideway extending normal to the channel. A platetype gate is mounted for reciprocation in the guideway between positions where a portion of the plate closes the channel and where a circular aperture in the gate is in register with the channel. The valve casing includes opposed chambers which extend outwardly from the body along the axis of the guideway to accommodate the end portions of the gate. The chambers are sealed from atmosphere; when the gate is in transit, purge gas is admitted to the chambers and flows inwardly through the gate-to-seat-ring, clearance, minimizing buildup of process solids therein. A shaft reciprocated by an external actuator extends into one of the sealed chambers through a shaft seal and is coupled to an end of the gate. Means are provided for adjusting the clearance between the first seat ring and the gate while the valve is in service. 6 claims. (ERA citation 05:029460)

SAN-1894/1 PC **A03**/MF **A01**
New Mexico Univ., Albuquerque. Center for Environmental Research and Development.
Solar Powered Liquid Piston Stirling Cycle Irrigation Pump. Research Grant, May 1, 1978-December 31, 1978.
G. C. Bell. 10 Apr 79, 29p
Contract ET-78-G-03-1894

Project objectives and work performed during the duration of the grant included construction of a laboratory prototype of the liquid piston Stirling cycle heat engine with modeling and simulation, a range of engine sizes to determine lift head ranges, capacities and principles of operation. Preliminary investigation of solar energy inputs indicates numerous feasible methods to operate heat engines. The maximum rate of pumping obtained was one liter per 26 seconds through 109 cm lift head. (ERA citation 05:002854)

UCID-18180 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Operating Manual for the Electrostatic Glove-Box Prefilter Installed Inside the Filter Glove Box No. 046 at Rocky Flats, Building 776.
W. Bergman, R. C. Kaifer, H. D. Hebard, R. D. Taylor, and B. Y. Boling, R. M. Lum. 11 May 79, 76p
Contract W-7405-ENG-48

Objective of the evaluation is to evaluate the effectiveness of the electrostatic prefilter in prolonging the life of HEPA (high-efficiency particulate-air) filters. The theory of the electrostatic filter is reviewed, and Glove Box Number 046 is described in detail, followed by a description of the electrostatic prefilter used in the present application. Engineering drawings of the electrostatic prefilter are included. The procedure for evaluating the electrostatic prefilter includes the steps for conducting five different tests: evaluating (1) the HEPA filter alone, (2 and 3) the HEPA filter with a standard prefilter treated both as disposable and reusable, and (4 and 5) the HEPA filter with the electrostatic prefilter, again treated as disposable and reusable. Procedures for flowmeter calibrations and measurements of particle-size distributions are also included. Long-term maintenence of the system during the evaluation program is outlined, and estimates of component durability are given. An electrical engineering safety note describes the high-voltage operational hazard of the electrostatic prefilter and the testing of safety devices (the current-overload trip circuit, the filter-door-interlock system, and the current-limiting resistor). (ERA citation 05:006075)

13L. Safety Engineering

AD-A086 328/2 PC **A04**/MF **A01**
Pacific-Sierra Research Corp Santa Monica CA
Physics of Large Urban Fires.
Final rept. May 79-Mar 80,
R. D. Small, and H. L. Brode. Mar 80, 65p Rept no. PSR-1010
Contract DCPA01-79-C-0291

Large scale urban fires which may accompany natural disasters or result from war-time actions are explored. The literatures pertaining to the macroscopic physics of large area fires is reviewed and analyzed, and areas where current understandings are deficient are identified. Features specific to a nuclear-weapon-initiated city fire are considered in detail. Based on hydrodynamic and thermodynamic principles, a self-consistent physical model is constructed which accounts for the unique properties of large area fires. Due to the scale of such events, a significant perturbation to the atmosphere results and a recirculation flow field is established. This accounts for the high velocity winds characteristic of firestorms observed in WW II fire bombings. Development of the governing equations shows that the urban area interactions are principally inviscid. Based on a component model, scalings suitable for formulation of small scale experiments are derived. Recommendations for future experimental and theoretical modeling studies are made in areas that would aid in emergency management of large scale fires and in dealing with disasters in which uncontrolled fire may play an important role (e.g., earthquakes, nuclear warfare, revolution). (Author)

PB80-200579 PC **A04**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Investigation of the Performance of Child Restraints in Serious Crashes.
Final rept. May 78-Jan 80,
John W. Melvin, Kathleen Weber, and Paula Lux. May 80, 66p UM-HSRI-80-12

The purpose of the project was to investigate the performance of child restraints in actual crashes. These cases are described in detail, and evaluations of the effectiveness of specific child restraints, used in specific ways in these crashes, are made. Two of the crashes were judged to be close in crash configuration and severity to laboratory dynamic test conditions. Conclusions of the study are as follows: (1) severe frontal crashes in which a child is properly harnessed in a properly secured child restraint are rare events; (2) child restraints that only meet static test criteria provide some injury protection in less severe crashes; (3) child restraints that meet dynamic test criteria provide excellent injury protection when used properly and still provide adequate protection in some misuse modes; and (4) further work is needed with respect to both vehicle structures and child restraint design to provide better side impact protection for children.

PB80-200710 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Marine Accident Report: Collision of S/T MOBIL VIGILANT and S/T MARINE DUVAL on the Neches River Near Beaumont, Texas, February 25, 1979.
28 May 80, 36p NTSB-MAR-80-8

At 0409 c.s.t., on February 25, 1979, the S/T MARINE DUVAL sank after colliding with the S/T MOBIL VIGILANT at a bend in the Neches River near Beaumont, Texas. The total damage to the vessels was estimated at $6,200,000. No persons were injured. The sunken MARINE DUVAL blocked the river for over 3 days, disrupting deep-draft vessel traffic via the port of Beaumont. The National Transportation Safety Board determines that the probable cause of the accident was the pilots' loss of control of their vessels, in a meeting situation in a bend, due to their failure to timely compensate for the effects on maneuverability of the limited depth of the channel, bank effect, and current eddies. Contributing to the accident was the failure of both pilots to use radar and their ineffective use of bridge-to-bridge radiotelephone to avoid meeting in a bend. The MARINE DUVAL sank as a result of hull damage below the waterline which was caused by the MOBIL VIGILANT's bulbous bow.

PB80-200850 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Marine Accident Report: Collision of Peruvian Freighter M/V INCA TUPAC YUPANQUI and U.S. Butane Barge PANAMA CITY, Good Hope, Louisiana, August 30, 1979.
12 May 80, 45p NTSB-MAR-80-7

About 0712 c.d.t., on August 30, 1979, the Peruvian freighter M/V INCA TUPAC YUPANQUI lost

steering control and struck the butane barge PANAMA CITY moored at General American Transportation Corporation Dock No. 4, Good Hope, Louisiana. As a result of the collision, liquefied butane was released, vaporized, ignited, and exploded in a ball of fire. Twelve persons died as a result of the accident. Damage was estimated at $10,500,000. The National Transportation Safety Board determines that the probable cause of this accident was the loss of steering control due to an electrical failure in the steering control system of the INCA TUPAC YUPANQUI. Contributing to the accident was the lack of two independent steering control systems, the failure of the master to post an anchor watch and a person on watch in the steering engineroom, and the location of the loading facility which unduly exposed the barge to approaching ships. Contributing to the extent of damage to the ship was the use of combustible materials in its deckhouse.

PB80-200868 PC **A02**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Marine Accident Report: Collision of the Spanish Freighter M/V POLA DE LENA with Two Mississippi River Ferry Boats and Gretna Ferry Landing, New Orleans, Louisiana, February 3, 1979.
10 Jun 80, 21p NTSB-MAR-80-10

At about 0400 c.s.t., on February 3, 1979, the outbound Spanish freighter M/V POLA DE LENA sustained a steering gear failure and collided with the Gretna Ferry terminal and the ferry vessel M/V CITY OF GRETNA which was moored at the terminal, at New Orleans, Louisiana. The impact of the collision caused the ferry vessel M/V SEN. ALVIN T. STUMPF to break loose from its terminal moorings and to drift downstream. There were no deaths or injuries, but property damage was estimated at $1,310,000. The National Transportation Safety Board determines that the probable cause of the accident was a steering gear failure on the POLA DE LENA which was caused by a loose electrical connection within the steering console on the bridge which interrupted electrical control of the starboard steering pump and the failure of the crew to energize the port steering pump immediately while continuing to use the nonfollowup, pushbutton mode. Contributing to the accident was the absence of written instructions prescribing the proper procedures to be followed in the event of a steering failure.

PB80-200983 PC **A08**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Reports - Brief Format, Issue Number 3, 1978.
Rept. for FY 1977, and 1978.
30 Jan 80, 167p NTSB-RAB-80-1
See also report dated 23 Aug 79, PB-300 923.

The publication contains briefs of selected railroad accidents occurring in U.S. railroad operations during fiscal years 1977 and 1978. The brief format presents basic facts, conditions, circumstances, and probable cause(s) in each instance. Additional statistical information is tabulated by types of accidents, and casualties related to types of accidents, carriers involved, and causal factors.

PB80-202880 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Pipeline Accident Report - Columbia Gas of Virginia, Inc., Natural Gas Explosion and Fire, Stanardsville, Virginia, October 24, 1979.
10 Jun 80, 45p NTSB-PAR-80-3

At 10:12 a.m., e.d.t., on October 24, 1979, an explosion and fire destroyed the Greene County Courthouse, gutted a connecting building which was under construction, and damaged nearby buildings in Stanardsville, Virginia. Thirteen persons were injured and the property damage was extensive. The National Transportation Safety Board determines that the probable cause of the accident was the rupturing of a natural gas service line by excavation equipment, which permitted the unrestricted escape of gas under 15-psig pressure into the basement of the building where it was ignited by an undetermined source. Contributing to the accident were the lack of a 'one-call' notification system, the failure of the county authorities through the architect to include the location of the service line on the construction blueprints and to notify the gas company of the planned excavation, and the absence of an installed excess flow valve in the service line. The gas company and the general contractor, who were both aware of the construction activities and of the existence of active gas lines in the area, also contributed to the accident by failing to communicate with each other to determine the location of the gas line.

PB80-203110 PC **A12**/MF **A01**
Dynamic Science, Inc., Phoenix, AZ.
Pickup and Van Side Structure Baseline Assessment Tests 1, 2, and 3 Vehicle-To-Vehicle 60 Degree Left Side Impact.
Final rept.,
R. Cropper. Nov 79, 265p 3053-79-196, DOT-HS-805-442
Contract DOT-HS-8-01942

The objective of these tests was to provide baseline data for unmodified pickup trucks and vans when involved in 60 degree left side vehicle-to-vehicle impact crashes. For these tests, the target vehicle was stationary and set at 60 degree to the line of travel of the bullet vehicle. The target vehicle was struck one inch rearward of the left DOR. The bullet vehicles for all three tests were 1978 Chevrolet Impala 4-Door Sedans. The target vehicles were as follows: 1978 Chevrolet C-10 Pickup, 1978 Ford Courier Pickup, and 1978 Ford E-150 Econoline Van.

PB80-203185 PC **A05**/MF **A01**
Factory Mutual Research Corp., Norwood, MA.
Fire Tests of Records Storage in a Fixed Shelving Module Under the Protection of Large-Drop Sprinklers.
Technical rept.,
P. J. Chicarello, and J. M. A. Troup. Jun 80, 100p RC80-T-45, GSA/PBS-79-135
Contract GS-00B-2237

This report covers three large-scale fire tests, with large-drop sprinklers, conducted in a records storage facilities. In the first test, the storage module was stocked with paper records in cardboard boxes. In the second and third tests, the storage module included plastic computer tapes as well as paper records. The storage module consisted of two double rows of multiple tier, steel shelving separated by a 30-in aisle. In the third test, an expanded metal catwalk was installed in the aisle at an elevation of 7 ft 1 in. The overall dimensions of the module were approximately 35 ft x 12.5 ft x 14 ft high. The tests showed that when the module is stocked with paper records, computer tapes, or a mixture of the two, large-drop sprinklers installed on a spacing of 10 ft x 10 ft and operating at a minimum pressure of 25 psi will provide excellent fire control and will limit the fire damage to a comparatively small area in the vicinity of the ignition point. In the absence of catwalks, the sprinklers will also provide excellent ceiling protection and exposed structural steel bar joists will not be endangered; but if catwalks are installed, the protection for exposed structural steel bar joists will be marginal. Detailed descriptions of the fire tests, together with the results and conclusions, are contained in the report.

PB80-203250 PC **A02**/MF **A01**
Institute for Road Safety Research, Voorburg (Netherlands).
Wet-Weather Accidents. What Can Road Authorities Do About Them.
1979, 21p

The Institute for Road Safety Research SWOV is conducting large-scale research into traffic hazards in the province of Noord-Brabant for that province's Council and the Minister of Transport and Waterways. Besides the specific problems in Noord-Brabant, research is also being carried out into more general problems. One such problem is the occurrence of accidents on wet road surfaces. Although the report is focused on the situation as regards Noord-Brabant provincial roads, much of the information is also useful for road authorities in other provinces of the Netherlands. The document discusses briefly the following topics: Accidents on wet road surfaces--extent and causes; The road authorities' task; (Establishing norms, Tracing locations with a comparatively large number of wet-weather accidents, At intersections, in bends and at places where the view is obstructed good road-surface quality is needed to prevent accidents on wet road surfaces); What action can the road authority take (Road design, Road pavement, Road maintenance); and Accident control on existing roads.

PB80-204043 PC **A02**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC.
The Effect of the 55 MPH Speed Limit on Traffic Accidents in Illinois.
Technical rept.,
Terry M. Klein. 17 Apr 80, 16p DOT-HS-805 400

The original intention of the 55 mph speed limit law following the Middle East Oil Embargo was to reduce gasoline consumption. A substantial reduction in traffic accidents, particularly fatal accidents, was experienced as a result of both the fuel shortage and the lowered speed limit. The State of Illinois experienced statistically significant reductions in fatal and injury accidents on Federal Aid Interstate and other State marked routes during the 55 mph speed limit time period. In addition, there were reductions in accidents on all road types, regardless of posted speed limit, during the period of the fuel shortage (October 1973-March 1974).

PB80-204951 PC **A05**/MF **A01**
Dynamic Science, Inc., Phoenix, AZ.
Pickup and Van Side Structure Baseline Assessment. Test No. 4. Vehicle-to-Vehicle 60 degree Right Side Impact.
Final rept. on Task 3,
Mark Pozzi. Mar 80, 89p 3053-80-080, DOT-HS-805-999
Contract DOT-HS-8-01942

The objective of the test was to provide baseline data for an unmodified pickup truck when involved in a 60 degree right side vehicle-to-vehicle impact crash. For this test, the target vehicle was stationary and set at 60 degrees to the line of travel of the bullet vehicle. The target vehicle was struck one inch rearward of the right door. The bullet vehicle for the test was a 1978 Chevrolet Impala 4-Door Sedan. The target vehicle for Test 3053-4 was a 1978 Ford Courier Pickup.

PB80-205727 PC **A04**/MF **A01**
IIT Research Inst., Chicago, IL.
Increased Rail Transit Vehicle Crashworthiness in Head-On Collisions. Volume I. Initial Impact.
Final rept. Jun 75-Jun 78,
Edward E. Hahn. Jun 80, 70p DOT-TSC-UMTA-80-17-1, UMTA-MA-06-0025-80-1
Contract DOT-TSC-1052-1
See also Volume 2, PB80-205743.

A specific goal of safety is to reduce the number of injuries that may result from the collision of two trains. In Volume I, a two-dimensional analytic simulation model of the leading cars of two impacting transit car consists is formulated. This model is capable of simulating the mechanics of head-on initial impact of two transit cars on straight level track. Specifically, the model is capable of establishing the critical parameters which govern whether the cars crush, override, or crush with subsequent override. This simulation model is used to assess impact control devices currently in service, such as anticlimbers, couplers, and draft gear. The report also presents a detailed experimental test plan for evaluating the strength and effectiveness of future designs of impact control devices which has been developed.

PB80-205735 PC **A11**/MF **A01**
IIT Research Inst., Chicago, IL.
Increased Rail Transit Vehicle Crashworthiness in Head-On Collisions. Volume IV. IITRAIN User's Manual.
Final rept. Jun 75-Jun 78,
Edward E. Hahn. Jun 80, 233p UMTA-MA-06-0025-80-4
Contract DOT-TSC-1052-4
See also Volume 1, PB80-205727.

A specific goal of safety is to reduce the number of injuries that may result from the collision of two

trains. In Volume IV, a computer code for the simulated crash of two railcar consists is described. The code is capable of simulating the mechanics of head-on impact of two consists on straight level track. The simulation is limited to two dimensions, namely a vertical plane containing the length of the track. The user can model the individual car componenets or cars in a complex or as simple a manner as is warranted by the simulation results desired. Although specifically developed for transit cars, the code can also be used to simulate freight trains or intercity passenger trains.

PB80-205743 PC **A05**/MF **A01**
IIT Research Inst., Chicago, IL.
Increased Rail Transit Vehicle Crashworthiness in Head-On Collision. Volume II. Primary Collision.
Final rept. Jun 75-Jun 78,
Edward E. Hahn, Steven C. Walgrave, and Theodore Liber. Jun 80, 80p DOT-TSC-UMTA-80-17-2, UMTA-MA-06-0025-80-2
Contract DOT-TSC-1052-2
See also Volume 4, PB80-205735.

A specific goal of safety is to reduce the number of injuries that may result from the collision of two trains. In Volume II, an analytical model in two dimensions, longitudinal and vertical, of the primary collision of two impacting urban railcar consists is formulated. This model includes the formulation of the leading cars developed in Part 1 of this program, and the distribution of mass and nonlinear force-deformation relationships existing among major structural sub-assemblages. This model also is capable of determining the extent of crushing and/or override suffered by the individual cars in the consists, as well as the time histories of displacement, velocity, and acceleration in both the longitudinal and vertical directions. Methods are developed for generating the dynamic force-deformation relationships for structural sub-assemblages comprising the critical modules of railcars. These methods include finite-element analysis, scale modeling, and full-scale testing procedures including specifications for required testing equipment and instrumentation.

PB80-208838 PC **A03**/MF **A01**
Princeton Univ., NJ.
Indirect Costs of Residential Fires,
Michael J. Munson, and James C. Ohls. Apr 80, 40p FEMA/FA-6
Prepared in cooperation with Mathematica Policy Research, Inc., Princeton, NJ. See also report dated Feb 78, PB-291 456.

The report presents the national estimates of indirect losses resulting from residential fires in the United States. Indirect losses are defined as costs other than direct property damages. The estimates are developed based on survey information from a stratified random sample of 883 households which had experienced fire losses approximately four months prior to being interviewed. The losses include medical costs, temporary housing costs, lost wages and a number of other components. The total indirect losses--all indirect costs for which it was possible to assign a monetary value--are estimated at between $220.3 million and $322.6 million per year. Out-of-pocket costs, those borne directly by households affected by fires are estimated to be between $105 million and $153.8 million per year. Indirect fire losses are generally greater for higher income households than for lower income households; higher for whites than other racial categories and higher for residents of owner occupied housing than for apartment dwellers. Methods for fire departments to make estimates of indirect costs per fire are included. In addition, methods for determining the frequency and nature of nonmonetary costs are also discussed.

13M. Structural Engineering

AD-A086 644/2 PC **A02**/MF **A01**
Clarkson Coll of Technology Potsdam NY Dept of Mechanical and Industrial Engineering
Optimality Criterion Techniques Applied to Structures Composed of Different Element Types.
Technical rept. Sep 78-May 80,
M. I. Syed, K. D. Willmert, and M. R. Khan. 1980, 10p Rept no. MIE-059
Contract N00014-76-C-0064
Presented at the AIAA/ASME Structures, Structural Dynamics and Materials Conference (21st), Seattle, WA, 12-14 May 80.

The optimality criterion design method, developed by Khan, Willmert and Thornton which exploits the concept of one most critical constraint, has been extended in this paper to handle more complex structures, specifically ones composed of several different types of elements. The elements considered were the truss, and two different plane stress elements: a constant strain triangular element and a rectangular symmetric shear panel. The optimality criterion method treats multiple load conditions and stress and displacement constraints. A wing-box structure is considered as an example to demonstrate the efficiency and simplicity of the method. (Author)

AD-A086 675/6 Not available NTIS
Southern Methodist Univ Dallas TX
Analysis of the Reliability of a New Scale for Housing Quality,
William R. Schucany, Edward R. Mansfield, Wayne A. Woodward, and James L. Hess. 19 Apr 77, 9p
Contract N00014-75-C-0439
Availability: Pub. in Jnl. of Statistical Planning and Inference, v3 p305-313 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 738/2 PC **A10**/MF **A01**
Scientific Service Inc Redwood City CA
Upgrading of Existing Structures.
Final rept. on Phase 2,
B. L. Gabrielsen, R. S. Tansely, and G. Cuzner. Jun 80, 203p Rept no. SSI-7910-5
Contract DCPA01-79-C-0231

This report presents the results of an investigation of blast upgrading of existing structures, which consisted of developing failure prediction methodologies for various structure types, both in 'as built' and in upgraded configurations, and verifying these prediction techniques with full-scale load tests. These upgrading schemes were developed for use as shelters in support of Civil Defense crisis relocation planning. Structure types investigated included wood, steel, and concrete floor and roof systems. The results of this study are being used in the development of a shelter manual presenting the various upgrading concepts in an illustrative workbook form for use in the field. (Author)

ESDU-80010 PC**$386.50**
Engineering Sciences Data Unit Ltd., London (England).
Local Instability of Truss Core Sandwich Panels Under Longitudinal Compression.
Data item.
c1980, 10p ISBN-0-85679-293-4
Supersedes ESDU-68038. Also pub. as ISSN-0141-4097.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The report researches buckling stresses for corrugated truss core sandwich panels under longitudinal compression over a range of truss geometries and different face plate to core thickness ratios. The results obtained may be applied to aircraft flooring, bulkheads, and structural panels in buildings. The research is limited to panels in which core and face plates are attached discretely or continuously, having core height to pitch ratios of between 0.2 and 1.4, and face plate to core thickness ratios of between 1 and 2.

PB80-200249 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Building Technology Publications. Supplement 4: 1979,
Karen Porterfield. Jun 80, 83p NBS-SP-457-4
See also Supplement 3 dated Jul 79, PB80-101249. Library of Congress catalog card no. 80-600086.

The report presents the National Bureau of Standards' Center for Building Technology (CBT) publications for 1979. It is the fourth supplement to NBS Special Publication 457, Building Technology Publications 1965-1975 and lists CBT documents issued or recorded during the period January 1 to December 31, 1979. It includes titles and abstracts of each NBS publication and each paper published in non-NBS media, key word and author indexes, and general information and instructions on how to order CBT publications. This report communicates the results of CBT research to various technical audiences, as well as to the general public. This document is divided into three main sections. The first, Titles and Abstracts, provides the report title, author(s), date of publication, selected key words, and an abstract of each NBS publication and each paper published in an outside source. The Author Index cites each CBT author and gives the publication title and/or number referencing documents listed in this supplement. The Key Word Index is a subject index, listing word summaries of the building research topics for each publication and paper. By selecting a main word or subject, which are listed alphabetically, the user is able to locate reports of interest through the subject-related words found in the key word index.

PB80-200520 Not available NTIS
National Bureau of Standards, Washington, DC.
Hazards: High Winds.
Final rept.,
E. Smith. 1980, 5p
Pub. in J. Architect, Educ. 33, n4 p23-27 1980.

The paper provides information, believed to be useful to architectural students and faculty, on damage caused by windstorms, extreme wind climatology, wind effects on buildings, tornado effects on buildings, effects of winds on users of buildings and outdoor spaces, sources of data on wind effects, and possible research topics on architectural implications of windstorms.

PB80-200751 PC **A07**/MF **A01**
Swedish Council for Building Research, Stockholm.
Behaviour of Bolted Beam-Column Connections under Catenary Action in Damaged Steel Structures,
Ulf Arne Girhammar. 1980, 139p D12:1980, ISBN-91-540-3213-X
Prepared in cooperation with Lulea Univ. (Sweden). Div. of Structural Engineering.

The capability of a steel structure to bridge over a local damage is to a large extent determined by the capacity of the beam-column connections. Catenary action is an effective loadbearing system in a damaged structure in order to prevent progressive collapse. Catenary tests of two types of connections, the bolted heel connection and the bolted end-plate connection, were performed.

PB80-200769 PC **A05**/MF **A01**
Swedish Council for Building Research, Stockholm.
Dynamic Fail-Safe Behaviour of Steel Skeleton Structures Having Bolted Connections,
Ulf Arne Girhammar. 1980, 80p D13:1980, ISBN-91-540-3215-6
Prepared in cooperation with Lulea Univ. (Sweden). Div. of Structural Engineering.

The aim of this report is to evaluate the dynamic behavior of steel skelaton structures in the area of primary damage, taking into account the real properties of different beam-to-column connections under catenary action. Especially, the dynamic damage endurance capacity of usual steel structures is evaluated. The dynamic analyses are verified by experiments.

PB80-200777 PC **A06**/MF **A01**
Swedish Council for Building Research, Stockholm.
Computer Aided Design in Rebuilding,
Eva Friis. 1979, 108p D15:1980, ISBN-91-540-3225-3

To provide for those who must decide on building projects or who must choose between alternative projects better grounds for their decisions and choices has from the onset been the central idea in this research work. With the help for example of modern calulating methods, it should be possible

systematically to evaluate different alternatives. If at an early planning stage costs and resultant qualities can be compared, discussions between those involved in the project become more meaningful. Certain general conditions have directed the course of the work. One assumption has for example been that good possibilities exist for improving the methods used today for planning and design by state, municipal and private real estate managers, inter alia for rebuilding projects. Another assumption was that if in the earliest idea stage of a project alternative solutions could be presented with calculations of the relevant costs and consequent qualities, then architects could and should recapture the initiative and the coordination of planning and design. Presented are three hypotheses: interviews conducted under the guidance of experts from the social sciences are an appropriate method for on the one hand recording needs and deficiencies in the planning process; system analysis can be a way of tackling ordinary cost-estimates so that they may be coupled to an analysis and an evaluation both of the preconditions and of the resultant benefits; and it is necessary to prepare a well thought-out presentation of the new ways in which the different professions are going to have to work together, be it spontaneously or in response to new legal regulations.

PB80-201445 PC **A08**/MF **A01**
SRI International, Menlo Park, CA.
Simulation of Strong Earthquake Motion with Contained-Explosion Line Source Arrays, Single-Source and Array Tests at Camp Parks.
Final rept.,
J. R. Bruce, H. E. Lindberg, and G. R. Abrahamson. Dec 79, 155p NSF/RA-79027
Grant NSF-PFR78-00993
See also report dated Mar 79, PB-301 096.

The development of a technique using explosives to simulate strong level, earthquake-like ground motion is described. The long range objective is in-situ testing of soil-structure interaction and of structures with complex internal equipment systems. The technique can be applied to buildings, nuclear reactors, pipelines, power lines, dams, bridges, and tunnels. It produces ground motion by simultaneous firing of a planar array of vertical line sources. The controlled release of high-pressure explosion products within each source allows controlled pressurization of the surrounding soil. Tests were performed with an array of ten 1/3-scale sources. Tests were also performed with single sources, both in 1/3-scale and full-scale. A quasistatic theory was developed to predict both single source and array response. The 1/3-scale array test results, when compared to 1/3-scale single source test results, showed a more than order magnitude increase in ground motion. The quasistatic theory predicted this result and compared favorably with both the single-source and array tests. Extrapolation of these results to full-scale showed an 80 x 40 ft. array can produce accelerations of 0.6 g, velocities of 1 ft./s, and displacements of about one inch at frequencies of 3 to 5 hz, a useful level of ground motion for structural testing.

PB80-203581 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Modeling of Standards: Technical Aids for Their Formulation, Expression, and Use.
Final rept.,
Richard N. Wright, Steven J. Fenves, and James Robert Harris. Mar 80, 18p NBSIR-80-1979
Prepared in cooperation with Carnegie-Mellon Univ., Pittsburgh, PA.

Standards are the primary communication and control mechanism used to describe building practices and products in communications between the various participants in the building process. Most prior research related to building standards has been concerned with understanding and improving the performance of building products. This work, in contrast, is concerned with improving the organization, expression and interpretation of the information contained in a standard. Techniques are described for objective and rigorous representation of the meaning of a standard. These allow it to be tested for aspects of clarity, completeness, consistency and correctness. Furthermore, the techniques allow alternative organizations and expressions to fit the needs of various users with assurance that meanings remain unchanged and that users will readily find and understand all provisions even in a new or unfamiliar standard.

PB80-203649 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Recommended Practice for Measuring Life-Cycle Costs of Buildings and Building Systems.
Final rept.,
Rosalie T. Ruegg, Stephen R. Petersen, and Harold E. Marshall. Jun 80, 77p NBSIR-80-2040

Rising prices of labor, material, and particularly energy have forced builders, architects, engineers, building owners and operators, and code writers to identify building designs and building systems that will be cost effective in the long run. This report describes how to measure the life-cycle costs of buildings and building systems. Life-cycle cost analysis, when applied to building decisions, provides an economic evaluation of the net dollar effect, over time, of purchasing, constructing/installing, maintaining, operating, repairing, and replacing buildings or building systems. This recommended practice for making life-cycle cost evaluations will assist the private and public building communities in making cost-effective decisions.

PB80-207632 PC **A12**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Research and Innovation in the Building Regulatory Process: Proceedings of the NBS/NCSBCS Joint Conference (4th) Held at St. Louis, Missouri on September 11, 1979, in Conjunction with the Annual Meeting of the National Conference of States on Building Codes and Standards (NCSBCS), Inc. (12th).
Final rept.,
Sandra A. Berry. Jun 80, 270p NBS-SP-586
Sponsored in part by National Conference of States on Building Codes and Standards, Inc., McLean, VA. Library of Congress catalog card no. 80-600080. See also report dated Jun 77, PB-267 310.

The Proceedings of the 4th Annual NBS/NCSBCS Joint Conference on Research and Innovation in the Building Regulatory Process contain nineteen technical papers, the opening remarks and Keynote Address. The subject matter covered in these Proceedings includes: Issues in Building Code Enforcement; Legal, Political and Educational Aspects of Code Enforcement; Studies Dealing with Housing Codes; Energy Conservation and the Built Environment; Design Considerations and Their Impact on Code Enforcement; and, Innovative Regulatory Approaches for Metrication, Insulation Standards, and Climatic Conditions.

14.
METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A086 272/2 Not available NTIS
Drexel Univ Philadelphia PA Dept of Mechanical Engineering and Mechanics
Microprocessor Utilization in Ultrasonic Nondestructive Inspection Systems,
Joseph L. Rose, and Graham H. Thomas. 1979, 8p
Contract N00014-77-C-0607
Presented at the National ASNT Conference, Denver, CO, 1978.
Availability: Pub. in Materials Evaluation, p69-76 Jan 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 386/0 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Ultrasonic Caustics in Non-Destructive Evaluation.
Technical rept.,
Peter A. Doyle. Jul 79, 26p Rept no. ARL/MAT-111

Caustics formed in the field diffracted by defects are explored theoretically as a possible approach to the inverse scattering problem for ultrasonic non-destructive evaluation. The case of crack-like defects is considered in detail using the geometrical theory of diffraction. The involute of the far field caustic reproduces the projection of the crack edge in the incident beam direction, for a plane incident wavefront. This purely geometrical inversion is carried out uniquely for the astroid and its involute, the elliptical edge. For a general edge shape, the complete inversion requires one further length measurement, which may be carried out in some cases by further experiments with caustics. Useful limitations on the possible shapes of caustics are explained on the basis of catastrophe theory. Calculations show that the inherent intensity level change (approximately 2-3 dB) and with (approximately wavelength) over which it occurs for a typical ultrasonic caustic are adequate for observation. Some discussion is given of experimental requirements, as well as of caustics formed in the near field of a crack and of those formed by voids and inclusions. The topology of the far field caustic cannot in general distinguish between volumetric and crack-like defects. Studying caustics may prove to be a useful adjunct to ultrasonic imaging systems for the inspection of fatigue cracks. (Author)

AD-A086 466/0 PC **A03**/MF **A01**
University of Strathclyde Glasgow (Scotland) Dept of Applied Physics
Integrated Thin Film DC Squids.
Final rept. Nov 76-Oct 79,
G. B. Donaldson. Oct 79, 26p
Grant DA-ERO-76-G-079

A new thin film low temperature facility has been developed and used for work on three aspects of DC SQUIDS. First, ellipsometric studies have been made of the process of RF sputter-etch oxidation of Pb-In alloys and of Nb. Second, structures based on Nb-NbOx-Pb/In Josephson junctions have been produced and successfully operated as planar SQUIDs with a flux noise of 0.000085 Phi sub o sq rt Hz. Finally, all Nb structures, based on Nb-NbOx/Au-Nb junctions, have been operated as SQUIDs though so far with inferior noise performance (0.05 Phi sub o sq rt Hz). Work is proceeding on the production of integrated magneometric structures using photolithographic techniques to etch planar flux-transformers and the associated components. (Author)

AD-A086 467/8 PC **A12**/MF **A01**
Locus Inc State College PA
Instrumentation for Detecting Hazardous Materials.
Final rept. Jun 79-Jun 80,
Gerard J. Gross, David E. Harris, Gerard Lachs, and Robert M. Dillman. Jun 80, 268p Rept no. 940-4
Contract DCPA01-79-C-0305

The status of material sensing technology as it might be applied to the detection and identification of hazardous materials is reviewed. The scope of types of hazards includes toxic, fire, and explosion hazards but not nuclear radiation hazards. A list of 115 materials considered to pose significant hazards in emergency operations is derived. Then both remote and non-remote instrument types are evaluated, with emphasis on their potential application for development of a portable detection instrument. Though no instrument exists now in a form ready to use for the role studied here, several types show promise for future development: a remote passive IR absorption instrument, a non-remote dispersive IR analyzer, and a non-remote portable gas chromatograph/mass spectrometer. A number of instrument types for purposes other than primary identification are also reviewed and comments made on application and future development. An extensive list of references on material sensing technology is included. (Author)

AD-A086 530/3 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
A Proposal for Aerodynamically Actuated Self Streamlining Subsonic Wind Tunnel Walls.
Aerodynamics note,
N. Pollock. Jun 79, 30p Rept no. ARL/AERO Note-392

An arrangement is described which ensures that solid flexible two dimensional subsonic tunnel walls will automatically and continuously assume a shape approximating an unconstrained streamline under the action of a model pressure field. Such a tunnel wall would minimize wall interference. Each wall consists of a streamwise tensioned membrane with a series of pressure tappings. These pressure tappings communicate with a number of flexible bellows which apply appropriate local forces to the membrane. Methods covering the extension of this concept to a three dimensional configuration are also discussed. (Author)

AD-A086 596/4 PC **A02**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Development of a Tubular Comparator for Radiographic Evaluation of Steel Tube Structures,
Technical memo.,
D. A. Olley. Mar 80, 17p Rept no. ARL/MAT-TM-374
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

A description is given of the development of a tubular comparator, containing internal blind holes, for application in the radiographic inspection of tubular components suspected of being corroded on their inner surfaces. (Author)

AD-A086 780/4 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Submicrosecond Comparisons of Time Standards via the Navigation Technology Satellites (NTS).
Interim rept. May-Sep 78,
J. Buisson, T. McCaskill, J. Oaks, D. Lynch, and C. Wardrip. 30 Apr 80, 14p NRL-8395, AD-E000 459

During May through September 1978 a six nation cooperative experiment was performed to intercompare time standards of major laboratories at the submicrosecond level using NTS satellites. NTS time transfer receivers, which were developed for use with the NTS series of satellites, were installed at the Division of National Mapping (DNM), Australia; in Japan at the Radio Research Laboratories (RRL) and the National Research Laboratory of Metrology (NRLM); National Research Council (NRC), Canada; Royal Greenwich Observatory (RGO), England; Bureau International de l'Heure, France (BIH); Institute for Applied Geodesy (IFAG), West Germany; and in the U.S. at the Goddard Space Flight Center (GSFC), National Bureau of Standards (NBS), Naval Research Laboratory (NRL), and the Naval Observatory (USNO). The results obtained by satellite were compared to those obtained by portable clocks. At all stations the differences were less than 0.75 microseconds. The RMS of the data from nine stations is less than 0.4 microseconds. (Author)

AD-A086 782/0 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Design and Fabrication of an Aerosol Concentrator.
Memorandum rept.,
R. K. Stilling, and H. E. Gerber. 8 May 80, 36p NRL-MR-4208, AD-E000 461

An aerosol concentrator used in conjunction with a folded-path transmissometer, was designed and fabricated at NRL. The concentrator extends the effective length of a laser beam used in the transmissometer by more than one order of magnitude by concentrating the particles in the ambient aerosol by a like amount. This report reproduces engineering drawings and describes the fabrication of the concentrator. Problems encountered during the fabrication and testing procedures are also discussed. (Author)

AD-A086 805/9 PC **A02**/MF **A01**
Maryland Univ College Park Dept of Chemistry
A Digital Temperature Control and Measurement System.
Technical rept.,
R. B. Strem, B. K. Das, W. T. Angel, J. T. Siewick, and S. C. Greer. 4 Jul 80, 24p Rept no. TR-1
Contract N00014-79-C-0008

An automated digital temperature control and measurement system with a temperature resolution of 0.3 to 3.0 mK and operating in the temperature range -40 C to +79 C is described in this report.

AED-Conf-77-283-005 PC **A02**/MF **A01**
Farbenfabriken Bayer A.G., Leverkusen (Germany, F.R.).
Auger Microanalysis in the Scanning Electron Microscope.
R. Holm. 1977, 16p CONF-7709140-1
In German.18. conference on electron microscopy, Muenster, F.R. Germany, 4 Sep 1977.
U.S. Sales Only.

Coupling of an Auger spectrometer with a conventional scanning electron microscope is described. By flushing the specimen with an argon gas jet a number of specimens, especially originating from the industrial practice, can be examined even without UHV. From this results the possibility of combined examination of a specimen by means of Auger and X-ray microanalysis. This opens up possibilities for gaining depth information in a non-destructive manner. In addition, by removing surface layers by bombarding with ions atomizing profiles may be recorded. Some examples, especially from the field of covering layers on metals, are to demonstrate the efficiency of the method and to indicate what additional information, as compared especially with X-ray microanalysis, may be obtained. (Atomindex citation 09:366022)

AED-Conf-77-283-007 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Long Working Distance Ion Gun Using a Field-Ionization Source.
R. Schwarzer, and K. H. Gaukler. 1977, 7p CONF-7709140-
18. conference on electron microscopy, Muenster, F.R. Germany, 4 Sep 1977.
U.S. Sales Only.

An ion gun consisting of a field-ionization tip and a three-electrode emission lens is described. The source which is pumped through the electrode bores is operated with Ar, H sub 2 , O sub 2 , and air. This experimental setup features mechanical simplicity and rugged operation under fairly rough vacuum conditions at 10 exp -3 Pa. Typical probe data with air as ionization gas are 4 x 10 exp -12 A for a probe 1.5 mu m in diameter at a working distance of 5 cm and a beam voltage of 30 kV. Using a cooled tip and improved lens design, ion microprobes of less than 1 mu m in diameter at 10 exp -10 A seem feasible. (Atomindex citation 09:383089)

AED-Conf-77-405-004 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Measurement of Very Low Temperatures with Thermoelements and Germanium Resistors.
W. Koeppe. 1977, 10p CONF-7710159-2
In German.DKV annual meeting, Hannover, F.R. Germany, 6 Oct 1977.
U.S. Sales Only.

In this paper especially thermocouples and germanium resistance thermometers are discussed, these two types of secondary thermometers permitting continous temperature measurement in the temperature range below 100 K, while relatively high requirements concerning the accuracy of measurement can be met, and both types of thermometers having got relatively small overall dimensions. All these requirements e.g. are not met by the vapor pressure thermometers still easier to be handled. (Atomindex citation 09:393719)

AED-Conf-77-537-003 MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Pyrotechnical Production of Labelled Aerosols and Their Use in the Ground Atmosphere.
W. K. G. Kuehn, and W. Alps. 1977, 7p CONF-7710173-6
In German.Meeting on aerosols in natural science, medicine and technology-measurement techniques and technical application, Karlsruhe, F.R. Germany, 26 Oct 1977.
U.S. Sales Only. Microfiche copies only.

As the emission of radioactive substances in the atmosphere is only allowed for a few short-lived radionuclides, the possibility of producing aerosols pyrotechnically and simultaneously labeling them with easily activated tracers was investigated. It has the following advantages: 1) the activation analysis guarantees a high detection sensitivity with a tracer element of large cross section: 2) there is no danger to the environment due to radioactivity during testing: 3) in general, there are no limits to the amount of indicator substance used: 4) the pyrotechnically produced aerosol can be used at any position of the atmosphere whereby line sources, point sources, and pulse sources can be produced with the generator. The generator can be shot by a signal pistol to the desired height in order to label harmful substances or other (emission) points as well: 5) the source is extremely mobile due to the small measurements and uncomplicated construction of the generator. (Atomindex citation 09:394964)

AED-Conf-77-537-006 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Production of Monodisperse Solid and Liquid Particles with the Spinning Top Generator.
C. Hillenbrand, and J. Porstendoerfer. 1977, 7p CONF-7710173-2
In German.Meeting on aerosols in natural science, medicine and technology-measurement techniques and technical application, Karlsruhe, F.R. Germany, 26 Oct 1977.
U.S. Sales Only.

The spinning top aerosol generator according to May, operated with compressed air, is suitable for the production of monodisperse particles in the 0.5-10 mu m range. With the generator, the dependence of particle size and concentration on various parameters was investigated. (Atomindex citation 09:386849)

AED-Conf-78-125-001 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Operational 150 KV Microfocus Rod Anode X-Ray System for Nondestructive Testing.
E. A. Fontijn. 1978, 8p CONF-780436-1
Lecture meeting and exhibition on non-destructive materials testing, Mainz, F.R. Germany, 24 Apr 1978.
U.S. Sales Only.

This paper describes an operational state of the art 150 kV microfocus rod anode X-ray system having ultra-high radiographic resolution capabilities. A cocal spot size of 0.050 mm is provided. Heretofore unattainable long rod anode lengths coupled with very small diameters are now possible using mini-magnetic lens technology. Over-all rod anode diameters as small as 9 mm with useful lengths of 1 m or more are possible, permitting panoramic inspections where previously only lower resolution radioisotope radiographic techniques were possible. Radiographic sensitivity of better than 1% has been reported with film-focal-distances on the order of 8 mm through 3 mm of steel. (Atomindex citation 09:418442)

CERN-79-02 PC **A03**/MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
Digital Teslameter.
K. Brand, and G. Brun. 19 Feb 79, 25p
U.S. Sales Only.

A self-contained instrument for the measurement of magnetic fields is described which consists of a command module and a thermally stabilized Hall plate mounted in a probe. The command module contains the circuitry for the temperature stabilization and the current source for the probe, an analog-to-digital converter and a microprocessor-based control circuitry for the command of the measuring sequences. A read-only memory contains a calibration table for the relation between Hall voltage and magnetic field. The measured field strength can be directly displayed in units of

induction (tesla). The teslameter is provided with a serial teletype input-output port for remote control. An addressing scheme allows up to 16 modules to be connected in parallel and to be controlled via a single teletype channel. This is especially useful if several teslameters are used in a complex measuring set-up. (Atomindex citation 10:470984)

INIS-mf-4283 MF **A01**
Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica.
Determination of Metallic Iron in Sponge-Iron. A Moessbauer Effect Application.
C. S. Mueller. 1974, 109p
In Portuguese.
U.S. Sales Only. Microfiche copies only.

The amount of metallic iron in sponge-iron is a parameter of major interest in the evaluation of the performance of the ore-reduction process and in the determination of the composition of the load of the electric furnace used to produce the steel. Moessbauer effect offers the promise of a simple and elegant analysis method, capable of competing directly with the usually time-consuming chemical procedures. The applicability of the method is considered and the possible sources of error are analyzed, resulting in the design of an instrument that is reasonably accurate and simple to use. Detailed electronic circuitry required to produce a direct-reading digital instrument is shown. (Atomindex citation 09:331799)

INKA-Conf-79-013-003
PC **A02**/MF **A01**
Dornier-System G.m.b.H., Friedrichshafen (Germany, F.R.).
Holographic Deformation Measurements for Materials and Component Testing.
K. Gruenewald. 1979, 1p CONF-790392-3
In German.DECHEMA colloquium on non-destructive materials testing in chemical apparatus engineering, Frankfurt am Main, F.R. Germany, 1 Mar 1979.
U.S. Sales Only.

No abstract available.

INS-J-159 PC **A02**/MF **A01**
Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study.
Beta-Ray Thickness Gauge with exp 14 C beta-Rays.
I. Nonaka, and I. Sugai. 31 May 78, 23p
U.S. Sales Only.

A beta -ray thickness gauge of transmission type with exp 14 C beta -rays has been developed for the measurements of target thicknesses below 10 mg/cm exp 2 . For this purpose, mass absorption coefficients mu /rho must be known. So the values of mu /rho for many chemical elements and for some compound films were determined. It was found that mu /rho increases linearly for light elements and decreases for heavy elements as the thickness of the foil increases. The rate of increase or decrease was also measured for many elements and compound films. The values of mu /rho depend largely on the geometrical conditions, especially on the distance between the foil and the detector. (Atomindex citation 10:455554)

JAERI-M-7862 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Studies on Low-Voltage X-Ray Radiography for Graphite Materials.
S. Muraoka, and H. Itami. Sep 78, 24p
U.S. Sales Only.

Low-voltage radiography has been studied to provide optimum technique for graphite less than 50 mm thick. First we determined the exposure conditions under which the most appropriate photographic density can be obtained. By parametric studies, an exposure chart was prepared. Then we studied how the environment of photographing affected the film density. Thirdly, by use of graphite materials with artificial flaws, Image Quality Indicator (I.Q.I.) sensitivity was determined. Detectability of a crack depended on an incidence angle of X-rays onto a crack. Finally, we photographed graphites having natural flaws and gained a useful information. (Atomindex citation 10:470466)

ND-R-305(S) PC **A02**/MF **A01**
UKAEA, Springfields (England). Nuclear Power Development Labs.
X-Ray Diffractometer Specimen Holder for Use with Reactive and Toxic Materials.
A. Huyton, and A. B. Munden. Apr 79, 13p
U.S. Sales Only.

An X-ray diffractometer specimen holder has been designed for analysis of reactive sodium compounds which will satisfactorily seal the sample from the atmosphere. The holder can be readily filled in a glove-box and is easily transported for mounting on a vertical Philips PW 1051 X-ray diffractometer. It is considered that this holder could also be applied to a wide range of other reactive and toxic materials, e.g. plutonium or its compounds. (Atomindex citation 11:496219)

NRCN(TN)-027 PC **A02**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Instrument for Measuring Metal-Thermoelectric Semiconductor Contact Resistence.
M. Lanxner, M. Nechmadi, B. Meiri, and I. Schildkraut. Feb 79, 15p
In Hebrew.
U.S. Sales Only.

An instrument for measuring electrical, metal-thermoelectric semiconductor contact resistance is described. The expected errors of measurement are indicated. The operation of the instrument which is based on potential traversing perpendicularly to the contact plane is illustrated for the case of contacts of palladium and bismuth telluride-based thermoelectric material. (Atomindex citation 10:475455)

N80-27421/0 PC **A11**/MF **A01**
Stanford Univ., CA.
Results of an ISEE-1 Experiment to Study the Interactions Between Energetic Particles and Discrete VLF Waves in the Magnetosphere.
Final Report.
Apr 80, 241p NASA-CR-160006
Contract NAS5-20871

Despite the malfunctioning of the digital portion of the experiment which is encoding the absolute amplitude of the wave spectrum with a fixed bias of approximately 20 dB, the analog portion of the instrument is acquiring excellent data concerning the wave function and relative amplitude. Results obtained over a 2-year period which have important implications for magnetospheric wave-particle interactions are examined in the areas of emission generation by nonconducted coherent waves, and cold plasma distribution in the inner magnetosphere.

N80-27674/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The Gsfc Mark-2 Three Band Hand-Held Radiometer.
C. J. Tucker, W. H. Jones, W. A. Kley, and G. J. Sundstrom. Jan 80, 33p NASA-TM-80641
Submitted for Publication.

A self-contained, portable, hand-radiometer designed for field usage was constructed and tested. The device, consisting of a hand-held probe containing three sensors and a strap supported electronic module, weighs 4 1/2 kilograms. It is powered by flashlight and transistor radio batteries, utilizes two silicon and one lead sulfide detectors, has three liquid crystal displays, sample and hold radiometric sampling, and its spectral configuration corresponds to LANDSAT-D's thematic mapper bands. The device was designed to support thematic mapper ground-truth data collection efforts and to facilitate 'in situ' ground-based remote sensing studies of natural materials. Prototype instruments were extensively tested under laboratory and field conditions with excellent results.

N80-27675/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Large Antenna Multifrequency Microwave Radiometer (Lammr) System Design.
J. L. King. May 80, 33p NASA-TM-80685

The large Antenna Multifrequency Microwave Radiometer (LAMMR) is a high resolution 4 meter aperture scanning radiometer system designed to determine sea surface temperature and wind speed, atmospheric water vapor and liquid water, precipitation, and various sea ice parameters by interpreting brightness temperature images from low Earth orbiting satellites. The LAMMR with dual linear horizontal and vertical polarization radiometer channels from 1.4 to 91 GHZ can provide multidiscipline data with resolutions from 105 to 7 km. The LAMMR baseline radiometer system uses total power radiometers to achieve delta T's in the 0.5 to 1.7 K range and system calibration accuracies in the 1 to 2 deg range. A cold sky horn/ambient load two point calibration technique is used in this baseline concept and the second detector output uses an integrated and dump circuit to sample the scanning cross-tract resolution cells.

N80-28292/4 PC **A04**/MF **A01**
Institut fuer Angewandte Geodaesie, Frankfurt am Main (Germany, F.R.).
Activities of the Kloppenheim Satellite Observation Station.
H. Grosse, and G. Soltau. 1979, 10p SER-B-230
Text in German; English Summary.

No abstract available.

PAT-APPL-6-003 559 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Apparatus for Checking the Direction of Polarization of Shear-Wave Ultrasonic Transducers.
Patent Application,
H. H. B. Karplus, and G. A. Forster. Filed 15 Jan 79, 11p
Contract W-31-109-ENG-38
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus for checking the direction of polarization of shear-wave ultrasonic transducers comprises a first planar surface for mounting the shear-wave transducer, a second planar surface inclined at a predetermined angle to the first surface to generate longitudinal waves by mode conversion, and a third planar surface disposed at a second predetermined angle to the first for mounting a longitudinal-wave ultransonic transducer. In an alternate embodiment, two second planar surfaces at the predetermined angle are placed at an angle to each other. The magnitude of the shear wave is a function of the angle between the direction of polarization of the transducer and the mode-conversion surface. (ERA citation 05:029473)

PAT-APPL-6-031 810 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Miniature Quartz Resonator Force Transducer.
Patent Application,
E. P. EerNisse. Filed 20 Apr 79, 7p
Contract AT(29-1)-789
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention relates to a piezoelectric quartz force transducer having the shape of a double-ended tuning fork. (ERA citation 05:029423)

PAT-APPL-6-067 855 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Improved Method and Apparatus for Chromatographic Quantitative Analysis.
Patent Application,
J. S. Fritz, D. T. Gjerde, and G. Schmuckler.
Filed 20 Aug 79, 22p
Contract W-7405-ENG-82
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved apparatus and method are described for the quantitative analysis of a solution containing a plurality of anion species by ion exchange chromatography which utilizes a single element and a single ion exchange bed which does not require periodic regeneration. The solution containing the anions is added to an anion exchange resin bed which is a low capacity macroreticular polystyrene-divinylbenzene resin containing quarternary ammonium functional groups, and is eluted there-

from with a dilute solution of a low electrical conductance organic acid salt. As each anion species is eluted from the bed, it is quantitatively sensed by conventional detection means such as a conductivity cell. (ERA citation 05:029373)

PAT-APPL-6-069 152 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Apparatus for Use in Rapid and Accurate Controlled-Potential Coulometric Analysis.
Patent Application,
T. L. Frazzini, M. K. Holland, C. E. Pietri, and J. R. Weiss. Filed 23 Aug 79, 15p
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus for controlled-potential coulometric analysis of a solution includes a cell to contain the solution to be analyzed and a plurality of electrodes to contact the solution in the cell. Means are provided to stir the solution and to control the atmosphere above it. A potentiostat connected to the electrodes controls potential differences among the electrodes. An electronic circuit connected to the potentiostat provides analog-to-digital conversion and displays a precise count of charge transfer during a desired chemical process. This count provides a measure of the amount of an unknown substance in the solution. (ERA citation 05:029372)

PAT-APPL-6-076 527 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Leak Test Fitting.
Patent Application,
P. T. Pickett. Filed 18 Sep 79, 10p
Contract EY-76-C-04-0053
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A hollow fitting for use in gas spectrometry leak testing of conduit joints is divided into two generally symmetrical halves along the axis of the conduit. A clip may quickly and easily fasten and unfasten the halves around the conduit joint under test. Each end of the fitting is sealable with a yieldable material, such as a piece of foam rubber. An orifice is provided in a wall of the fitting for the insertion or detection of helium during testing. One half of the fitting also may be employed to test joints mounted against a surface. (ERA citation 05:029557)

PATENT-4 171 644
Not available NTIS
Department of Energy, Washington, DC.
Means for Ultrasonic Testing when Material Properties Vary.
Patent,
L. S. Beller. Filed 28 Feb 78, patented 23 Oct 79, 6p PAT-APPL-882 025
Suprsedes PAT-APPL-882 025-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device is provided for maintaining constant sensitivity in an ultrasonic testing device, despite varying attenuation due to the properties of the material being tested. The device includes a sensor transducer for transmitting and receiving a test signal and a monitor transducer positioned so as to received ultrasonic energy transmitted through the material to be tested. The received signal of the monitor transducer is utilized in analyzing data obtained from the sensor transducer. 3 claims. (ERA citation 05:029478)

PATENT-4 172 224
Not available NTIS
Department of Energy, Washington, DC.
Process for the Detection of Micro-Cracks.
Patent,
N. Lapinski, and A. Sather. Filed 24 Oct 78, patented 23 Oct 79, 4p PAT-APPL-954 380
Supersedes PAT-APPL-954 380-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A process is described for the nondestructive testing of ceramic objects to detect the presence of defects and microcracks in the surface in which a solution of silver nitrate is applied to the surface of the object which penetrates into the surface defects, drying the object so that the silver nitrate remains in the defects, and preparing an x-ray radiograph whereby any defects and microcracks will appear in the radiograph. 4 claims. (ERA citation 05:029479)

PB80-200389 Not available NTIS
National Bureau of Standards, Washington, DC.
Spin and Energy Analyzed Photoemission: A Feasibility Analysis.
Final rept.
D. T. Pierce, C. E. Kuyatt, and R. J. Celotta. Nov 79, 7p
Sponsored in part by Office of Naval Research, Washington, DC.
Pub. in Review of Scientific Instruments 50, n11 p1467-1473 Nov 79.

New scientific opportunities, particularly for investigation of surface magnetism, will be provided by spin and energy analyzed photoemission. Electron-optical conservation laws and phase space concepts are summarized and applied to determine the feasibility of an experiment consisting of a photoemitter in a magnetic field, a photoelectron energy analyzer and an electron spin analyzer. For the example of photoemission from a Ni crystal using He resonance radiation and typical parameters for the energy and spin analyzers, a final signal count rate of approximately 220 counts/s is calculated. Ways to increase the count rate by orders of magnitude are described. In particular, a new experimental configuration is suggested which may avoid the large reduction in count rate caused by the magnetic field.

PB80-200538 Not available NTIS
National Bureau of Standards, Washington, DC.
Silicon Photodiode Absolute Spectral Response Self-Calibration.
Final rept.,
E. F. Zalewski, and J. Geist. 15 Apr 80, 3p
Pub. in Applied Optics 19, n8 p1214-1216, 15 Apr 80.

A new technique is demonstrated for the determination of the absolute spectral response of a uv enhanced silicon photodiode. This technique is completely independent of the traditional approaches to absolute radiometry based on the thermal physics of blackbodies or electrically calibrated radiometers and surpasses them in accuracy and simplicity. For the photodiodes used in this study the radiant power in a 1 mW laser beam at 0.63299 micrometers was measured to within an uncertainty of + or - 0.04%.

PB80-200686 Not avaliable NITS
National Bureau of Standards, Washington, DC.
On a Proposed Josephson-Effect Voltage Standard at Zero Current Bias.
Final rept.,
R. L. Kautz. 1 Mar 80, 3p
Pub. in. Applied Physics Letters 36, n5 p386-388, 1 Mar 80.

A voltage standard has been proposed which uses a series array of Josephson junctions locked to rf-induced constant-voltage steps at zero current bias. The feasibility of this proposal is examined in theory and experiment by determining the conditions under which rf-induced steps cross the zero current axis and the stability of phase lock under the zero bias condition.

PB80-200835 PC **A05**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Alternate Enzymes for Use in Cholinesterase Antagonist Monitors, (CAM's).
Final rept. Nov 76-Sep 77,
Louis H. Goodson, and Vicki J. Appleman. May 80, 84p EPA-600/2-80-083
Contract EPA-68-03-0299

The Cholinesterase Antagonist Monitors ('CAM's') normally use cholinesterase as the sensor in the detection of organophosphate and carbamate pesticides. The present investigation has been concerned with a search for alternate enzymes that could be used in the CAM system and that would enable it to detect a variety of other types of environmentally important toxic chemicals including chlorinated hydrocarbons, phenols, aryl phosphates, cyanide, heavy metals, etc. Five enzymes including alkaline phosphatase, carboxyl esterase, glucose oxidase, carbonic anhydrase, and hexokinase have been incubated with dilute solutions of toxic chemicals and the degree of enzyme inhibited by low levels of toxic test compounds. It is concluded that these and similar enzymes are of potential value in the detection and monitoring of toxic substances in water.

PB80-202690 PC **A04**/MF **A01**
Laser Analytics, Inc., Bedford, MA.
A Tunable Diode Laser Stack Monitor for Sulfuric Acid Vapor.
Final rept. Sep 78-Mar 80,
Edwin F. Pearson, and Arlan W. Mantz. 1979, 72p EPA-600/2-80-174
Contract EPA-68-02-2990

A field prototype instrument for continuous in-situ monitoring of sulfuric acid vapor in industrial smoke stacks has been developed. The method of detection is dual wavelength differential absorption in the infrared. Two tunable diode lasers are locked to two specific frequencies that provide analytical and background absorption information. The difference between the analytical and background absorption yields the net absorption due to sulfuric acid. Calibration of the monitor depends upon a precise determination of the differential absorption coefficient for the analytical and background frequencies. Measurements made as a part of this program yield a value of 0.00122/ppm/m and tend to resolve the discrepancies between previously published values. Temperature gradients in the absorption cells severely influenced previous measurements. The monitoring system was field tested at a 650 MW electrical generation plant burning high sulfur oil of Venezuelan origin. The excess air supplied to the boiler combustion chamber was varied from 0.5 to 1.5 percent. Measured baseline concentration of sulfuric acid ranged from 3 to 15 ppm. As the excess air was stepped up from 0.5 to 1.5 percent, the average measured increase in concentration was 39 ppm. The system gave consistent results during the brief test period.

PB80-203433 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Dimensions/NBS. Volume 64, Number 3, April 1980.
Monthly rept.
Apr 80, 28p NBS/DIM-64/3
See also report dated Mar 80, PB80-169535.

This monthly magazine features short summaries of major technical developments, highlights of work in progress, major speeches and statements by Bureau management, and a listing of NBS publications. The table of contents for the current issue is: So Near, Yet So Far, F. McGehan; NBS Budget Request, M. Heyman; These Are Gamma Rays Color Them Blue, M. Baum; New NBS Gas Flow Calibration Service is Referenced to Mass Flow Standards, K. Higgins; Laser-Initiated Chemical Chain Reactions, S. Leone; Trace Characterization of Drugs of Abuse, J. Blaha; CONFERENCES; PUBLICATIONS; NEWS BRIEFS.

PB80-203490 PC **A02**
California Univ., Santa Barbara.
An Inexpensive Frequency-Modulated (FM) Audio Monitor of Time-Dependent Analog Parameters,
Ronald B. Langdon, and Robert S. Jacobs.
c1980, 12p NOAA-80060904
NOAA-04-7-158-44121
Pub. in Jnl. of Pharmacological Methods, v3 p181-190 1980.

The standard method for quantification and presentation of an experimental variable in real time is the use of visual display on the ordinate of an oscilloscope screen or chart recorder. This paper describes a relatively simple electronic circuit, using commercially available and inexpensive integrated circuits (IC), which generates an audible tone, the pitch of which varies in proportion to a running variable of interest. This device, which is called an 'Audioscope', can accept as input the monitor output from any instrument that expresses an experimental parameter as a dc voltage. The Audioscope is particularly useful in implanting microelectrodes in-

tracellularly. It may also function to mediate the first step in data recording on magnetic tape, and/or data analysis and reduction by electronic circuitry. It is estimated that this device can be built, with two-channel capability, for less than $50, and in less than 10 hr by an experienced electronics technician. (Copyright (c) Elsevier North Holland, Inc. 1980, Journal of Pharmacological Methods.)

PB80-204159 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Semiconductor Measurement Technology: Metrology for Submicrometer Devices and Circuits.
Final rept.,
W. Murray Bullis. Jun 80, 45p NBS-SP-400-61

The metrological requirements of semiconductor microelectronics, always challenging, are made even more stringent by the trend toward submicrometer devices and structures. This comes about not only because of the obvious demands associated with the smaller feature sizes of circuit elements but also because of the attendant requirements for more efficient design verification aids, computer simulations, and process validation and control techniques and because of the concurrent trend toward larger die and package sizes. This paper examines the types of metrological requirements associated with submicrometer devices and structures, summarizes the present state of the art in selected critical areas of metrology, and reviews current research and development efforts on advanced measurement technology, especially those at the National Bureau of Standards.

PB80-205198 PC **A05**/MF **A01**
Southern Research Inst., Birmingham, AL.
Development of a Portable Device to Collect Sulfuric Acid Aerosol.
Final rept. Sep 76-Sep 78,
Herbert C. Miller, David W. Mason, and William J. Barrett. May 80, 100p EPA-600/2-80-087
Contract EPA-68-02-2468
See also report dated Feb 77, PB-264 257.

A quantitative, interference-free method for collecting sulfuric acid aerosol on a filter was developed and field tested. Since previous research found that severe losses of sulfuric aicd were caused by ammonia, ambient particulate material, and other interferents, a method was needed that converts sulfuric acid to a stable derivative for subsequent analysis. Methods evaluated for direct fixation of sulfuric acid aerosol were not found to be selective. Therefore, a sampling method was investigated that uses a combination of selective volatilization of the sulfuric acid, prefiltration of particulate interferents, and derivatization of the vaporized acid on an alkali-impregnated filter. Research on the volatilization, prefiltration, and derivatization technique, and the development and field evaluation of a prototype sampler based on this technique are described.

PNL-SA-7718 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Development of Nomarski Microscopy for Quantitative Determination of Surface Topography.
J. S. Hartman, R. L. Gordon, and D. L. Lessor.
1979, 25p CONF-790838-3
Contract EY-76-C-06-1830
23. annual international symposium of the Society of Photographic Instrumentation Engineers, San Diego, CA, USA, 27 Aug 1979.

The use of Nomarski differential interference contrast (DIC) microscopy has been extended to provide nondestructive, quantitative analysis of a sample's surface topography. Theoretical modeling has determined the dependence of the image intensity on the microscope's optical components, the sample's optical properties, and the sample's surface orientation relative to the microscope. Results include expressions to allow the inversion of image intensity data to determine sample surface slopes. A commercial Nomarski system has been modified and characterized to allow the evaluation of the optical model. Data have been recorded with smooth, planar samples that verify the theoretical predictions. (ERA citation 05:009027)

SAND-79-1681 PC **A06**/MF **A01**
Sandia Labs., Albuquerque, NM.
Design and Construction of a Prototype Vaporization Calorimeter for the Assay of Radioisotopic Samples.
T. V. Tormey. Oct 79, 101p
Contract EY-76-C-04-0789

A prototype vaporization calorimeter has been designed and constructed for use in the assay of low power output radioisotopic samples. The prototype calorimeter design was based on that of a previous experimental instrument used by H.P. Stephens, to establish the feasibility of the vaporization calorimetry technique for this type of power measurement. The calorimeter is composed of a mechanical calorimeter assembly together with a data acquisition and control system. Detailed drawings of the calorimeter assembly are included and additional drawings are referenced. The data acquisition system is based on an HP 9825A programmable calculator. A description of the hardware is provided together with a listing of all system software programs. The operating procedure is outlined, including initial setup and operation of all related equipment. Preliminary system performance was evaluated by making a series of four measurements on two nominal 1.5W samples and on a nominal 0.75W sample. Data for these measurements indicate that the absolute accuracy (one standard deviation) is approx. = 0.0035W in this power range, resulting in an estimated relative one standard deviation accuracy of 0.24% at 1.5W and 0.48% at 0.75W. (ERA citation 05:006030)

SAND-79-2074C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Adaptive Spectral Analysis Technique for Unbiased Frequency Estimation in the Presence of White Noise.
P. A. Thompson. 1979, 10p CONF-791125-3
Contract EY-76-C-04-0789
13. Asilomar conference on circuits, systems, and computers, Pacific Grove, CA, USA, 5 Nov 1979.

An adaptive spectral analysis technique is presented for estimating the frequencies of sinusoids corrupted by white noise. This new method is an online implementation of a harmonic-retrieval method proposed by Pisarenko involving the minimum eigenvalue and the associated eigenvector of the covariance matrix. This eigenvector, whose components translate into frequency estimates, is sought adaptively (without explicitly evaluating the covariance matrix) using a stochastic gradient algorithm and an appropriate nonlinear parameter constraint. The method described here is closely related to an adaptive prediction-error implementation of the autoregressive or maximum entropy estimator, but it avoids the frequency bias that is characteristic of the latter when noise is present in the observed data. (ERA citation 05:009029)

SAND-79-8052 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Technical Manual for the Eclipse S-200, S-230 Data Acquisition Program DATA.
H. W. Swan. Oct 79, 44p
Contract EY-76-C-04-0789

The Eclipse computer-based data acquisition/reduction center was developed by Sandia Laboratories to replace the older analog recording methods in its vibration and spin facilities. The principal data acquisition program for the system is called DATA. This manual describes, from the viewpoint of the systems programer, the external characteristics and internal workings of this program. 6 figures, 3 tables. (ERA citation 05:001707)

SAND-79-8053 PC **A04**/MF **A01**
Sandia Labs., Livermore, CA.
User's Manual: Primary Data Reduction Programs for the Eclipse S-200/230 Shock and Vibration Measurement Systems.
H. W. Swan. Oct 79, 62p
Contract EY-76-C-04-0789

The manual describes, from an operator's viewpoint, how to use the primary data reduction programs for the Eclipse shock and vibration measurement system. The graphical output includes power, energy, and shock spectra, and transfer-function and time-history plots. (ERA citation 05:001620)

SAND-79-8055 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
User's Manual for Eclipse S-200/230 Digital Data Acquisition System.
S. Folkendt, Jr., and H. W. Swan. Oct 79, 36p
Contract EY-76-C-04-0789

The Eclipse S-200/S-230 Digital Data Acquisition System is a stand-alone data acquisition and reduction center for dynamic mechanical testing. The systems digitally record test data from random vibration, sine sweep, damped sine shock, drop table, and centrifuge, and generate plots immediately on completion of the test on a Tektronix hard copy unit. Plots can be simple time history, visicorder format, power spectral density, cross PSD, transfer functions, coherence, energy spectral density, or shock spectrums. A magnetic tape link with the CDC 6600 is available so that past compatibility can be maintained if desired. (ERA citation 05:003481)

SAND-79-8057 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Precision Volume Measurement System.
R. L. Jones. Oct 79, 32p
Contract EY-76-C-04-0789

A precision volume measurement system (PVMS) has been designed, built, and put into operation. The system is based on pressure-volume-temperature principles, uses helium as the source gas, and maintains temperature stability in a calorimeter bath. The accuracy/precision of the system varies with the size of the measured volume; however, typical readings for a 100-cm exp 3 volume show a precision of approximately 0.03% and an accuracy of approximately 0.05%. (ERA citation 05:003557)

SAND-79-8064 PC **A05**/MF **A01**
Sandia Labs., Livermore, CA.
Operating Procedure for the Eclipse S-200/230 Data Acquisition/Reduction Systems.
S. Folkendt, Jr. Nov 79, 98p
Contract EY-76-C-04-0789

The Eclipse S-200 (ES200) and S-230 (ES230) are all-digital, stand-alone data acquisition and analysis systems for vibration and shock testing. This document describes the procedure for system power-up, data gathering, and quick-look plotting. It also serves as a user's reference manual to the system. (ERA citation 05:004805)

SMHI-HBF-PM-229 PC **A02**/MF **A01**
Sveriges Meteorologiska och Hydrologiska Inst., Norrkoeping.
Wave Measuring Project for Wave Energy Prospecting Purpose.
I. Mattisson. Dec 78, 17p
U.S. Sales Only.

The Swedish Meteorological and Hydrological Institute (SMHI) has developed a special microcomputer programme designed for a wave measuring system capable to produce real-time wave spectra. The wave gauge being used is an inverted echo-sounder working at the frequency of 710 kHz. The wave measuring systems are located at three lighthouses where SMHI has automatic stations for collection of meteorological and oceanographical data. The echo-sounders are placed at a depth of 25 metres. The microcomputer, which is the basic unit in the automatic station, samples the wave record and computes the wave spectra and some other significant wave data. The data are transmitted to SMHI every hour by our automatic data transmission system. The wave data will be used in a study of the economic feasibility of wave power plants in Swedish coastal waters. (ERA citation 05:024001)

UCID-18163(Pt.2) PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Thermal Complex Information System. 2. Schedules and Costs.
H. S. Ames, E. E. Nesbit, M. R. Posehn, and S. J. Sweeney. 1979, 59p
Contract W-7405-ENG-48

This document contains a detailed description of the plans to upgrade the Site 300 Thermal/Mechanical test complex (B830, B832, B833, B834). The project started in the fall of 1978, and is expected to be completed in early 1981. Phase I is

the purchase of two computers, development of minimal data management capability and data acquisition capability, and installation. The second phase is the acquisition of the three computers (BLD 832), acquisition of B830 hardware, development of calibration units and data capture units for B832, development of full data management capability and installation. Finally, there will be a continuing effort for system evaluation, support, and enhancements. Each of the tasks which comprise TCIS is described. 10 figures, 10 tables. (ERA citation 05:003949)

UCID-18213 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Portable Flash Radiography.
R. H. Bossi. 17 Aug 79, 13p
Contract W-7405-ENG-48

Flash x-ray radiography is now available as a service of the Nondestructive Evaluation Section of the Materials Engineering Division. A variety of experiments can be performed using a number of x-ray head configurations and multiple exposure techniques. Specially trained technicians and engineers can assist in the design of experiments, setup, and testing. (ERA citation 05:003517)

UCRL-81605 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Low Impedance Manganin Stress Gauge System for Severe Shock Wave Environments.
R. Weingart, J. Chan, L. Erickson, J. Janzen, and H. Vantine. 26 Apr 79, 13p CONF-790635-1
Contract W-7405-ENG-48
10. transducer workshop, Colorado Springs, CO, USA, 12 Jun 1979.

Manganin piezoresistive stress gauges have been applied to static pressure measurements for over 75 years and have found application in shock wave physics for almost two decades. Recently, the small size, fast response, and potential ruggedness of the gauges have led to their application in one of the more severe regimes of shock physics, reactive hydrodynamic flow. In reacting high explosives, pressures range up to 40 GPa (4 x 10 exp 5 atm) and turbulence forms rapidly. Obtaining accurate pressure records from manganin gauges for more than one or two microseconds beyond shock arrival is a challenging experimental design problem. Such stress time histories can be used, however, to precisely calculate explosive energy release rates and verify computer models of reactive hydrodynamic flow. An improved manganin gauge system with an extended lifetime in severe hydrodynamic environments and a reproducibility better than 2% has been developed. (ERA citation 04:047338)

UCRL-81669 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Transducer Field Test Set.
T. B. Miller, and H. S. Freynik, Jr. 2 Aug 79, 14p CONF-790635-4
Contract W-7405-ENG-48
10. transducer workshop, Colorado Springs, CO, USA, 12 Jun 1979.

The Transducer Field Test Set is a unique multifunction instrument designed primarily for use with strain-gage-based transducers. The test set incorporates into one portable unit many of the individual instruments and functions required to install, check out, calibrate, troubleshoot, and measure data from transducers at sites away from the transducer laboratory. This unit eliminates the necessity for locating, collecting, and transporting the necessary separate components each time a test is fielded. The operation of the Field Test Set (FTS-1) and the tasks it is able to perform are described. Improvements to be incorporated into the second generation design (FTS-2) are discussed. (ERA citation 05:003559)

UCRL-84295 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
LLL Calibration and Standards Facility.
G. W. Campbell, and J. H. Elliott. 15 Apr 80, 10p CONF-800534-1
Contract W-7405-ENG-48
Seminar series on traceability for ionizing radiation measurements, Gaithersburg, MD, USA, 8 May 1980.

The capabilities of Lawrence Livermore Laboratory's Calibration and Standards Facility are delineated. The facility's ability to provide radiation fields and measurements for a variety of radiation safety applications and the available radiation measurement equipment are described. The need for national laboratory calibration labs to maintain traceability to a national standard are discussed as well as the areas where improved standards and standardization techniques are needed. (ERA citation 05:024573)

Y-2190 PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Noncontact, Laser Interferometer Sweep Gage.
W. E. Barkman. 19 Nov 79, 16p
Contract W-7405-ENG-26

Parts that are manufactured with diamond tools on precision machines typically exhibit high-quality surfaces and contours; however, most materials that are diamond turned easily are also relatively soft and damage easily. Therefore, a noncontact, rotary inspection machine was developed. This machine utilizes a focused beam from a laser interferometer to measure variations in the surfaces of the reflective, spherical test parts used to characterize precision machines. Digital output data from the laser display is converted to an analog signal which is available for additional processing to provide contour and/or surface texture information. (ERA citation 05:009034)

14D. Reliability

AD-A086 280/5 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA Guidance and Control Div
Orientation of Measurement Sensors for Optimum End-Of-Life Performance.
Final rept.,
P. K. Mazaika. 25 Jun 80, 28p TR-0080-(5901-03)-1, SD-TR-80-41
Contract F04701-79-C-0080

Relative orientations of on-board measurement sensors are found that ensure the best possible measurement accuracy in the end-of-life situation when all but three sensors have failed. For five and six sensors, the optimum orientations are, respectively, the single cone and dodecahedron configurations. For seven and eight sensors, new configurations are found that are, respectively, 25 and 20% more accurate than previously proposed configurations. In general, there is a tradeoff between performance at end-of-life and performance earlier in a configuration's lifetime. (Author)

14E. Reprography

AD-A086 471/0 MF **A01**
Wisconsin Univ-Madison
Monitoring the use of Riverways with Aerial Photography: The Development, Testing, and Evaluation of a Computer Assisted Methodology.
Final rept.,
R. H. Becker, William A. Gates, and Bernard J. Niemann, Jr. 31 Mar 80, 363p
Contract DACW25-79-C-0008
Availability: Document partially available.

The objectives of this investigation were to develop, test and evaluate a recreational monitoring methodology using aerial photography and computer assisted data capture with auxiliary equipment. To meet these objectives, photography was flown, interpretation techniques were developed and utilized, hardware was assembled, software was written and recreational monitoring results were obtained. Section 1, includes a statement of objectives, how the report is organized, a summary of available photography, a brief summary of methods employed, and some conclusions. Section 2, Pool 16 Users Results, includes the results obtained from applying the methodology for six flights over Pool 16. It also includes discussion of the results and provides graphic examples of results. Section 3, Evaluation of the Methodology, includes equipment and personnel requirements, the time utilized developing and testing the methodology, and the costs incurred. The reliability of the methodology, error control and error discovery are discussed. Section 4, Aerial Photographic Methods, includes a detailed discussion of the methods and equipment employed to purchase, obtain and process the aerial photography for the riverway. Section 5, Interpretative methods, discusses the methods employed to interpret, locate and encode targets from the potography. Section 6, Handbook/Codebook, includes a detailed description of each variable encoded as part of the methodology. It also includes the rules used to interpret each of the target types.

PB80-808918 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Drafting Machines and Practice. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
C. Gilbert Young. May 80, 145p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited abstracts discuss computer-aided and standard drafting practices and machines. Standards, document generation, identification and filing systems, symbols, drafting techniques, interactive graphics and the use of computers in drafting and design are some of the subjects covered. (Contains 140 citations)

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

AD-A086 820/8 PC **A05**/MF **A01**
Department of Defense Explosives Safety Board Alexandria VA
Methodology for Chemical Hazard Prediction. Change 3.
Technical paper,
Morris C. Johnson. Jun 80, 78p Rept no. DDESB-tp-10-CHG-3
Supersedes rept. no. DDESB-TP-10-CHG-2 dated Nov 77, AD-A047 737.

The Technical Paper describes an appropriate method for estimating, for planning purposes, hazard distances associated with hypothetical Maximum Credible Events (MCE) from which toxic substances might be released into the atmosphere. In particular, the method is comprised of a mathematical model and complete sets of input data representing appropriate parametric values for wide ranges of geographical and meteorological environments. Certain subordinate mathematical models are also provided to facilitate calculations when the MCE includes either spills of toxic substances onto ground surfaces or plumes which ascend rapidly because of heat generated by fuel fires, etc. (Author)

15C. Defense

AD-A086 708/5 PC **A08**/MF **A01**
General Accounting Office Washington DC Program Analysis Div
Models, Data, and War: a Critique of the Foundation for Defense Analyses.
12 Mar 80, 165p Rept no. GAO/PAD-80-21
Report to the Congress.

A prominent feature of modern Government is the extent to which the executive branch has institutionalized quantitative methodology (cost-effectiveness analysis, computer modeling, etc.) as an aspect of budgeting and decision-making. Proponents term this 'scientific management,' and view it as a salutary extension of the 'objective' tools of science and mathematics. This argument has substantial merit, but it obscures the fact that quantitative methodology has considerable potential in both scientific (or 'objective') and 'subjective' applications. The difference, whether an application is based on scientific fact or 'quantified judgment,' has obvious importance in the context of decision making. This report examines the nature of quantitative methods (cost-effectiveness analysis, computer modeling, etc.) and some of the problems in their use for the analysis of public policy issues.

AD-A086 716/8 PC **A06**/MF **A01**
Applied Decision Analysis Inc Menlo Park CA
Analytic Procedures For Designing and Evaluating Decision Aids.
Final rept. Apr 79-Mar 80,
Allen C. Miller, III, Peter A. Morris, Richard D. Smallwood, Ronald K. Langford, and Robert S. Gibbons. Apr 80, 116p Rept no. ADA-2017
Contract N00014-78-C-0240

The purpose of this current research is to extend the analytical taxonomies of Navy tactical command and control decisions developed during the previous phase of this research, develop a practical method for using taxonomies of decision characteristics and functions to evaluate and improve decision aids, and apply the method to the identification and design of improved aids for antiair warfare decisions. In addition, several analytical procedures have been developed to measure formally some of the characteristics and capabilities of decision aids that are outlined in the taxonomies.

15D. Intelligence

AD-A086 451/2 PC **A05**/MF **A01**
Operating Systems Inc Woodland Hills CA
Cognitive Processes in Intelligence Analysis: A Descriptive Model and Review of the Literature.
Interim rept.,
Robert V. Katter, Christine A . Montgomery, and John R. Thompson. Dec 79, 85p ARI-TR-445
Contract MDA903-78-C-2044
See also Rept. no. ARI-RR-1237, AD-A086 503.

The descriptive model of cognitive processes in intelligence analysis presented in this report was developed as a part of a study entitled 'Investigation of Methodologies and Techniques for Intelligence Analysis.' The approach to constructing the model is based on the investigation of analytical processing in two types of single source analysis (SIGINT and IMINT), subsequently generalizing to multisource analysis. For the purposes of this investigation, intelligence analysis was defined as a spectrum of analytical and judgmental activities involved in the processing and production of intelligence, where particular individuals may devote more or less time to different aspects of such activities according to their individual roles in the intelligence cycle. The present paper contains a detailed review of selected aspects of current psychological literature, as well as the cognitive model which is based on that literature and on investigation of the IMINT and SIGINT production models. The cognitive model and the literature review focus on how information is processed, stored and retrieved from memory, evaluated and integrated to form intelligence. The model has general applicability to the full spectrum of intelligence processing activities.

AD-A086 455/3 PC **A08**/MF **A01**
Operating Systems Inc Woodland Hills CA
Imagery Intelligence (IMINT) Production Model.
Research rept.,
Christine A. Montgomery, John R. Thompson, and Robert V. Katter. Jan 80, 163p OSI-R79-003, ARI-RR-1210
Contract MDA903-78-C-2044

The Imagery Intelligence (IMINT) Production Model was developed as a part of a study entitled 'Investigation of Methodologies and Techniques for Intelligence Analysis,' which is aimed at constructing a model of the cognitive processes underlying intelligence analysis. The approach to constructing such a model is based on the investigation of analytical processing in two types of single source analysis (SIGINT and IMINT), subsequently generalizing to multisource analysis. For the purposes of this investigation, intelligence analysis was defined as a spectrum of analytical judgmental activities involved in the processing and production of intelligence, where particular individuals may devote more or less time to different aspects of such activities according to their individual roles in the intelligence cycle. Section 1 describes the IMINT model in the context of the study discussed above, and also treats the scope of the model and the collection of the information on which the model is based. Section 2 presents an overview of the model, describing findings about the role of the imagery interpretation analyst, the impact of management on analysis, the IMINT time dimension, and the special role of informal information channels in IMINT analysis. This section also describes the format of the model description, which is represented in terms of hierarchical input-process-output (HIPO) charts. Section 3 presents IMINT the model, production management activities and processing, analysis, and reporting activities.

AD-A086 503/0 PC **A04**/MF **A01**
Operating Systems Inc Woodland Hills CA
Human Processes in Intelligence Analysis: Phase I Overview.
Final rept.,
Robert V. Katter, Christine A. Montgomery, and John R. Thompson. Dec 79, 74p ARI-RR-1237
Contract MDA903-78-C-2044
See also Rept. no. ARI-RR-1210, AD-A086 455 and Rept. no. ARI-TR-445, AD-A086 451.

This report provides an overview of the results of a study entitled 'Investigation of Methodologies and Techniques for Intelligence Analysis.' The goal of this study was to develop a framework for understanding human processes in intelligence analysis. An understanding of these processes will be useful during the development or evaluation of training procedures, doctrine, and system requirements for automated support to analysts. The approach taken in this project was a parallel development of intelligence production models and a cognitive model of intelligence analysis. The Imagery Intelligence (IMINT) Production Model (AD-A086 455) developed under this project and an existing Signals Intelligence (SIGINT) production model were used as the basis for developing a generic model of intelligence production, described in this Overview. The generic production model includes a description of the hierarchical flow of intelligence data, tasking, etc., as well as a listing of critical variables influencing analysis. A detailed review of the psychological literature described in AD-A086 451, combined with the production models, led to development of a descriptive model of cognitive processes described in this overview. This overview also explores some of the implications of the cognitive model for training developments, system development, and organizational control of intelligence production. The cognitive model will be extended and these implications will be examined in greater detail during Phase II of this project. (Author)

AD-A086 792/9 PC **A04**/MF **A01**
Maryland Univ College Park Computer Vision Lab
Image Understanding Using Overlays.
Final rept. 1 Apr 78-31 May 80,
Azriel Rosenfeld. 31 May 80, 65p
Contract DAAG53-76-C-0138, DARPA Order-3206
Prepared in cooperation with Westinghouse Defense and Electronics Systems Center, Baltimore, MD. System Development Div. See also AD-A057 191.

This project is concerned with the study of advanced techniques for the analysis of reconnaissance imagery. The Westinghouse Systems Development Division, as a subcontractor, is investigating implementation of the techniques being developed by the Univ. of Maryland; the subcontract is entitled 'Architecture for higher level digital image processing'.

PB80-928211 PC **E02**/MF **A01**
Central Intelligence Agency, Washington, DC.
Chinese Defense Spending, 1965-79.
Research paper.
Jul 80, 14p SR-80-10091
Color illustrations reproduced in black and white. Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928200.

The report describes trends in estimated Chinese defense spending for the 1965-79 period and outlines major constraints that probably will affect spending during the 1980s. It uses cost estimates based on a building-block approach similar to the one used by the Central Intelligence Agency for costing Soviet defense activities. This approach is necessary because the Chinese publish almost no information on their defense spending.

15F. Nuclear Warfare

UCID-18494(Pt.1) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Conflict Simulation Laboratory-II. Part I. Functional Requirements.
H. S. Ames, S. A. Bly, and R. S. Hager. 20 Nov 79, 27p
Contract W-7405-ENG-48

The Conflict Simulation Laboratory (CSL) provides graphic and computation tools to model nuclear combat through simulated tactical battlefields and war games. By introducing new weapon effects, new weapon systems, or new organizations, an analyst can war game a variety of doctrines, force deployments, and tactics. Once the basic parameters are determined, the analyst can try various iterations to determine sensitivity to variations of these parameters. The CSL facility has been very useful but needs to be enhanced to handle future studies. This document is the first in a series leading to the development of the hardware and software which will be referred to as the second generation Conflict Simulation Laboratory. The document is divided into three parts: a brief description of the existing capabilities, a description of the functions of the proposed system, and a justification for the proposed system. 3 figures, 2 tables. (ERA citation 05:009043)

UCID-18494(Pt.3) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Conflict Simulation Laboratory-II. Part 3. Schedules and Costs.
H. S. Ames, and S. A. Bly. 10 Dec 79, 34p
Contract W-7405-ENG-48

This document contains a strategic plan for the development of the LLL second-generation Conflict Simulation Laboratory, CSL-II. CSL-II provides graphic and computation tools to model nuclear combat through simulated tactical battlefields and war games. By introducing new weapon effects, new weapon systems, or new organizations, an analyst can war game a variety of doctrines, force deployments, and tactics. The project will require the purchase of a high-speed computer and graphics devices and the conversion of existing simulation codes to run on the new computer. This document contains estimates of the manpower requirements, hardware costs, and development schedules for development of CSL-II. 12 figures, 5 tables. (ERA citation 05:009044)

15G. Operations, Strategy, and Tactics

AD-A086 287/0 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
A High Resolution Integrated Combat and Logistics Model (STAR-LOG).
Master's thesis,
Donald Glen Kirby, and Douglas Peter Schultz.
Mar 80, 110p

This thesis presents a design for a simulation of the ammunition and fuel combat service support activities that are an integral function of a U.S. brigade battle. The model expands the existing Simulation of Tactical Alternative Responses (STAR) model to simulate the combat leader's logistical decision logic from the vehicle to the battalion commander and the actions of the support facilities within the brigade area. The program design is executed in the Software Design and Documentation Language (SDDL) which produces an output that closely resembles SIMSCRIPT source code in format and structure. (Author)

AD-A086 386/6 PC **A24**/MF **A01**
Army Materiel Development and Readiness Command Alexandria VA
Engineering Design Handbook. Army Weapon Systems Analysis. Part 2.
Oct 79, 565p Rept no. DARCOM-P-706-102
See also Part 1 dated Nov 77, AD-A055 007.

Although Part Two covers some of the more advanced topics of the field of Army Weapon Systems Analysis, it starts with the definition of and concepts relating to measures of effectiveness (MOE), and describes in some detail many MOE's. The aim is to point out that MOE's are not universal but may depend on particular evaluations, and the Army analyst is introduced to the relation between the problem of modeling processes and MOE's. After an introduction to target detection phenomena and to the development of target detection probabilities, the important topics of Lanchester type combat theory for homogeneous and heterogeneous forces are given in much depth since these topics lead up to weapon equivalence concepts and studies. For the present-day analyst, the fields of optimal firing policies, weapon-target allocation problems, human factors, and cost analysis estimation must be rather thoroughly covered -- at least to the extent herein. Moreover, it was felt important to include also an introduction to cost-effectiveness, evaluations the concepts of survivability, and an introduction to countermeasures and their analytical treatment. This handbook describes some of the prime topics in the history of war games and combat simulations, including developments and uses, and brief descriptions of some of the key war games or computer simulations of combat. The last chapters of Part Two cover evaluation techniques for infantry weapons, tank weapon systems, artillery families, air defense (Modern Gun Effectiveness Model), and the principles and an illustration of cost and operational effectiveness analyses.

AD-A086 452/0 PC **A03**/MF **A01**
General Accounting Office Washington DC Procurement and Systems Acquisition Div
Implications of Highly Sophisticated Weapon Systems on Military Capabilities.
30 Jun 80, 33p Rept no. GAO/PSAD-80-61
Report to the Congress.

High performance systems are costly. Those responsible for developing and acquiring new weapon systems must be just as concerned with the capability of the equipment when it is deployed as they were with the acquisition. Although some yet-to-be deployed systems designed in the mid-1970s are likely to exhibit many of the same problems occurring in the high performance weapons deployed today, recently developed systems should benefit from emphasis on reliability, availability, and maintainability, therefore presenting a brighter future. However, a reappraisal of some may be in order. As shown by recent directives, more attention should be paid in the early design of weapons to the best mix of high performance and support characteristics, considering expected force resources and operations. Defense's emphasis on lower cost weapon systems and greater reliability, although well placed, does not appear to have been sufficient. While established inventory objectives for new weapons are high, rapidly rising unit costs make it unlikely that they can be achieved without major increases in or realignment of the defense budget.

AD-A086 519/6 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Ground Movement Modelling in the STAR Combat Model.
Technical rept.,
James K. Hartman. May 80, 57p Rept no. NPS55-80-021
Contract MIPR-32CAAM01

This report describes the ground movement module used in the STAR combined arms combat simulation model. The model capabilities, data requirements, and computer programs used are presented. This report is one of a series of STAR publications. (Author)

AD-A086 524/6 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
CASTAG - A Computer Assisted Interactive Naval Wargame.
Master's thesis,
Kevin John Kelley. Mar 80, 158p

CASTAG is an interactive two-sided computer wargame which models the movement and detection functions for the manual naval wargame SEATAG, developed at the Naval War College. CASTAG is programmed for the CP/CMS time sharing system on the IBM-360 at the Naval Postgraduate School. (Author)

AD-A086 564/2 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
Some Utility Programs for the STAR Combat Simulation Model.
Technical rept.,
James K. Hartman. Jun 80, 26p Rept no. NPS55-80-022
Contract MIPR-CD-1-80

This report is a user's manual for several utility programs which have been written to aid the program development effort for the STAR combined arms combat simulation model. (Author)

AD-A086 565/9 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
An Examination of the Conceptual Basis of a Tactical, Logistical, and Air Simulation (ATLAS).
Master's thesis,
Man Kwon Nam. Mar 80, 124p

The increased need of evaluation of recent worldwide operational contingencies leads various military-staff and defense-planning agencies to use an existing theater-level-combat simulation for such evaluation work. In this context, the ATLAS (A Tactical, Logistical, and Air Simulation) model is a candidate. This model has been widely used in the United States. However, the ATLAS model has some particularly severe potential limitations due to its aggregation methodology. Furthermore, its current documentation is quite poor and non-comprehensive to the general user. This thesis presents a detailed description of the conceptual basis of ATLAS for providing a better understanding of the model to the general potential users. The thesis identifies the model implications, analyzes the model logic and functional areas, discusses the model characteristics, and finally gives some suggestions for the use of ATLAS. (Author)

AD-A086 583/2 PC **A02**/MF **A01**
RAND Corp Santa Monica CA
Air Scatterable Land Mines as an Air Force Munition,
John K. Walker, Jr. Mar 78, 20p Rept no. RAND/P-5955
Presented at the Air University Airpower Symposium, Battlefield Support in the 1980's, Air War College, Maxwell AFB, AL, 14 Feb 78.

This discussion has touched upon some aspects of the following hypotheses: The extensive array of mine countermeasure gear in Warsaw Pact ground forces formations suggests considerable respect for the potential of mines to impede armored vehicle mobility. In the absence of some delaying influence, Pact combat power can build up at a faster rate than a defender can cope with or maneuver to counter. Disruption may be viewed as a combination of vehicle destruction, formation delay and diversion, and interruption of orderly command and control. A number of related interactions that are subtle and not well understood currently cannot be defined or measured. A number of opportunities appear to exist for useful employment of air scatterable land mines by tactical aircraft. But there are some problems, as well, several of which may be reduced through joint service understanding, testing, and cooperation. An initial step in this direction might be an appreciation of countermobility as an attack objective, using disruption as the effect to be sought rather than destruction of discrete target elements. (Author)

AD-A086 588/1 PC **A03**/MF **A01**
RAND Corp Santa Monica CA
A Method for Evaluating Advanced Systems and Concepts for Ground Combat,
E. Paxson, and Milton Weiner. Nov 78, 33p Rept no. RAND/R-2365-ARPA
Contract MDA903-78-C-0121, ARPA Order-3486
See also Rept. nos. RAND/R-2376-ARPA, AD-A067 564 and RAND/R-2377-ARPA, AD-A067 283.

The detailed evaluation of proposals for improved ground-combat systems or concepts can assist defense planners and system designers in understanding the systems' capabilities and limitations before major funding commitments are made. If the proposed systems and concepts do not differ markedly from current ones, standard evaluation techniques such as wargaming or systems analysis are appropriate. Special methods are likely to be necessary, however, for advanced concepts and systems that may dictate innovations in how a unit or force is organized, how it will operate, and the tactics it will employ. This report describes one such method. It can be used to illuminate the interrelationships between a system's technological characteristics and its tactical employment. The method described here uses a three-dimensional 'terrain table,' a computer program, and a series of analytic modules developed for a hand calculator. With these tools, a detailed minute-by-minute play is conducted. This permits innovative decisions to be introduced, friendly and enemy actions to be examined in detail, and tactical-technological interactions of the systems to be clearly understood.

AD-A086 639/2 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
German Counter-C3 Activity and its Effects on Soviet Command, Control, and Communications During Operation Barbarossa.
Master's thesis,
John Francis O'Neil, Jr. Mar 80, 175p

This study was conducted to examine German planning for Operation Barbarossa and German execution of that operation from 22 June to 31 July 1941 to determine the planning and execution of counter-C3 activities and the effects of those activities on Soviet command, control, and communications. Research was restricted to English language sources and included interviews with Soviet and German participants of the Eastern Front, two trips to the U.S. Army Military History Institute at Carlisle Barracks, Pennsylvania and the Hoover Institute on War, Revolution and Peace at Stanford University, Palo Alto, California, and a trip to the National Archives in Washington, D.C. The results of this study indicate no counter-C3 doctrine on the part of the Germans, and no concerted counter-C3 plan to disrupt Soviet C3 during Operation Barbarossa. This study does indicate a dramatic disruption of Soviet C3 during the opening stages of Operation Barbarossa. (Author)

AD-A086 689/7 PC **A05**/MF **A01**
Vector Research Inc Ann Arbor MI
Methods for Comparing Counterweapon System Developments in Terms of Contributions to Force Effectiveness.
Final rept.,
Robert L. Farrell. 29 Aug 78, 77p Rept no. VRI-DBSI-1-FR78-1
Contract DAAK30-78-C-0022

This is the final report of Vector Research, Incorporated, (VRI) efforts under contract DAAK30-78-C-0022. Under this contract, BRI designed methods for the comparative analysis of weapon system developments which could be used in analyzing counter weapon designs. The methods were demonstrated with analyses of artillery-related problems. (Author)

AD-A086 750/7 PC **A04**/MF **A01**
TRW Defense and Space Systems Group McLean VA Washington Operations
Tactical Operations Analysis System (TOAS) Baseline Configuration.
Interim rept. Sep 78-Sep 79,
George Slaton, and Mike Murphey. Feb 80, 51p
TRW-0221-80-01, RADC-TR-80-21
Contract F30602-78-C-0196

This report describes the baseline system being installed at the Tactical Operations Analysis Support Facility at Langley AFB VA under RADC Project 2315. This effort is part of Project 2315, which is directed at developing improved and new automated techniques for the enhancement of Tactical Operational Intelligence support. The baseline system provides the means to implement the project objectives by providing the facility for the test, evaluation and development of Tactical Operational Intelligence processes for automated improvement techniques. This report also provides a focal point for identifying the operational facility requirements and procedures for utilization and maintainability of the resources. (Author)

AD-A086 801/8 PC **A13**/MF **A01**
Army War Coll Carlisle Barracks PA
Psychological and Unconventional Warfare, 1941-1952: Origins of a Special Warfare Capability for the United States Army.
Study project rept.,
Alfred H. Paddock, Jr. Nov 79, 292p

This study examines the United States Army's activities in psychological and unconventional warfare during and after World War II to determine the impetus for, and origins of, the formal 'special warfare' capability created in 1952 with the establishment of the Psychological Warfare Center at Fort Bragg, North Carolina. With the impetus of the Korean War, heightening cold war tensions, and the persistent pressures of Secretary of the Army Frank Pace, Jr., the Army created an unprecedented staff organization in early 1951: the Office of the Chief of Psychological Warfare (OCPW). Under Brigadier General Robert A. McClure, the OCPW guided the build-up of psychological warfare and formulated plans for the creation of an organization unique in the Army's history: the 10th Special Forces Group. Designed to organize, train, and support indigenous personnel in behind-the-lines resistance activities to 'retard' a Soviet invasion in Europe, the Group's true historical forerunner--contrary to the official lineage of Special Forces--was the Office of Strategic Services, not the Rangers or the 1st Special Service Force. To provide the necessary training, materiel, and doctrinal support for both conventional and psychological warfare, McClure convinced the Army to establish the Psychological Warfare Center at Fort Bragg, North Carolina.

16.

MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A086 268/0 PC **A08**/MF **A01**
Acurex Corp Mountain View CA
Development and Testing of a Two-Stage Hybrid Launcher.
Final rept. 1 Sep 77-31 Oct 79,
K. E. Suchsland, J. D. Watson, T. J. Dahm, and J. L. Hull. 31 Oct 79, 173p ACUREX-FR-79-19/as(7386), DNA-5074F, AD-E300 807
Contract DNA001-76-C-0407

This report summarizes the development to date of a 1/4-scale launcher designed to launch a 7.2-kg model at a 6.1 km/sec in full scale. The hybrid launcher design principles are reviewed. Projected performance shows launch masses within soft-launch constraints that are 3 to 4 times larger than possible by using a conventional two-stage launcher. The results of component development tests leading to the subscale demonstration are presented. The importance of tungsten liners for obtaining the projected performance is emphasized, and the results of liner bond developments are described. (Author)

16B. Missile Trajectories

SAND-79-1347C MF **A01**
Sandia Labs., Albuquerque, NM.
Comparison of First and Second Order Techniques for Computing Optimal Horizontal Gliding Trajectories.
W. E. Williamson, Jr. 1980, 17p CONF-800104-2
Contract EY-76-C-04-0789
18. AIAA aerospace sciences meeting, Pasadena, CA, USA, 14 Jan 1980.
Microfiche copies only.

The problem of numerically computing maximum endurance subsonic gliding trajectories which remain in a horizontal plane and return to the original starting point is considered. The control is parameterized and numerical solutions for two different types of parameterization are shown. Piecewise continuous polynomial control approximations are shown to produce consistent results for the trajectories which should be very good approximations for the true optimal solution. (ERA citation 05:006059)

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A086 603/8 PC **A02**/MF **A01**
ORINCON Corp La Jolla CA
Sound Speed Estimation as a Means of Improving Target Tracking Performance,
D. L. Alspach, G. L. Mohnkehn, and R. N. Lobbia. 1979, 7p
Contract N00014-77-C-0296
Presented at the Asilomar Conference on Circuits, Systems, and Computers (13th), Pacific Grove, CA, Nov 79.

this paper addresses the issue of target tracking when confronted with a set of sound speed parameters that are partially or completely unknown. It explores the case where these parameters are augmented to the target state in an extended Kalman filter. The filter processes measurements of sound time-of-arrival difference and Doppler difference from a set of spatially displaced sensors. For scenarios involving up to three sensors it has been found that biased target position estimates and marginal system observability occurs. This is readily verified by propagating the engine values of the information matrix in time. Using this as an analysis tool, a number of geometrical sensor configurations are analyzed. In general, it is found that with three sensors, the system is, at best, marginally observable for any geometry. However, when using four and more sensors, system observability and estimation performance are markedly improved when two of the sound speed filter parameters are specified to within a close tolerance of their actual values. When attempting to estimate all of the sound speeds (or for that matter (n-1)) sound speeds, n = number of sensors), it is again noted, as in the three-sensor case, that system observability and estimation performance become degraded. (Author)

AD-A086 605/3 PC **A02**/MF **A01**
ORINCON Corp La Jolla CA
A Case Study in Adaptive Sound Speed Estimation,
R. N. Lobbia, and D. L. Alspach. 1978, 12p
Contract N00014-77-C-0296
Presented at the Asilomar Conference on Systems Science, Nov 78.

This paper deals with the problem of sound speed estimation as an aid in improving our knowledge of the position of a drifting sonobuoy. This is accomplished by processing the outputs of a spatially displaced set of hydrophone sensors in an extended Kalman filter. The filter's state vector may be augmented to provide estimates of the sonobuoy's position, velocity, and the sound speed from the sonobuoy to each of the hydrophones. It is shown that with just time-of-arrival difference and doppler difference measurements, system observability is marginal - directly resulting in biased estimates of the sonobuoy's location. With the additional use of bearing measurements, it is than shown how this enhances system observability and consequently, estimation performance. (Author)

AD-A086 731/7 MF **A01**
Naval Research Lab Washington DC
Acoustic Raytracing to Fixed Ground Receivers (Program AIRRAY).
Final rept.,
Evan B. Wright. 11 Apr 80, 62p NRL-MR-4185, AD-E000 451
Availability: Microfiche copies only.

AIRRAY is a FORTRAN-IV program for air-acoustic raytracing with wind. It finds all multipath arrivals, from a source at arbitrary elevation, at a set of equally-spaced receivers along a ground track. Tables of transmission loss vs range and bearing, or range and source height, are computed. (Author)

AD-A086 800/0 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Distributed Sensor Networks.
Semiannual technical summary rept. 1 Apr-30 Sep 79,
Richard T. Lacoss. 30 Sep 79, 44p ESD-TR-79-330
Contract F19628-78-C-0002, ARPA Order-3345

Research in the areas of tracking, signal processing, and system software is reported. A review of possible tracking techniques from the area of artificial intelligence was completed, and an approach selected for further development effort. Signal processing algorithms for measuring acoustic azimuths were further developed. Progress with software and hardware development of an acoustic data acquisition system, which will evolve into an experimental DSN node, is reported. (Author)

AD-A086 844/8 PC **A14**/MF **A01**
Naval Postgraduate School Monterey CA
The Statistics of Finite Bandwidth Modulated Acoustic Signals Propagated to Long Ranges in the Ocean, Including Multiple Source Effects.
Doctoral thesis,
Peter Nicholas Mikhalevsky. Feb 79, 321p

The statistics of acoustic signals propagated to long ranges in the ocean are investigated in detail in this thesis. The phase random model of multipath propagation is extended to include finite bandwidth and/or modulated sources as well as multiple source configurations. The theoretical analyses include the derivation of many new prob-

ability density functions for these new cases as well as for the single narrowband source. The analysis of multiple sources, applicable to noise problems, includes important approximations to densities which are intractable analytically, and would involve significant computer time to solve exactly. In addition to studies of the amplitude densities, significant progress has been made in solving for the amplitude rate densities and the joint densities of amplitude and amplitude rate.

17B. Communication

AD-A086 355/5 MF **A01**
Applied Psychological Services Inc Wayne PA Science Center
A Digital Simulation Model of Message Handling in the Tactical Operations System. V. User's Guide to the Integrated MANMOD/CASE/SAMTOS Computer Simulation.
Final rept. 1 Jul 74-31 Dec 75,
W. Rick Leahy, Arthur I. Siegel, and J. Jay Wolf. Oct 79, 138p ARI-TR-414
Contract DAHC19-75-C-0001
See also AD-A076 779.
Availability: Microfiche copies only.

This document is a complete guide for the use and interpretation of the computer simulation program--MANMOD. The program is stored in files on the Univac 1108 computer at the Edgewood Arsenal. The MANMOD program calls the Army Research Institute's MANMOD simulation of the Tactical Operations System and provides an interface with the CASE and the SAMTOS computer simulation models. The MANMOD program is written in FORTRAN IV. Sufficient information is provided in this manual to allow simulations to be performed by individuals with minimum computer related experience. In addition, detailed flow charts and variable lists are provided for the use of skilled programmers who desire a more technical description of the mechanics of the simulation and to allow program changes to be made more easily. (Author)

AD-A086 432/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Generalized TDMA: The Multi-Accessing Tree Protocol.
Journal article,
John I. Capetanakis. 18 Jan 79, 10p JA-4938, ESD-TR-79-295
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Communications, vCom-27 n10 p1476-1484 Oct 79.

No abstract available.

AD-A086 446/2 PC **A03**/MF **A01**
Stanford Univ CA Computer Systems Lab
Distribution of Packet Delay and Interdeparture Time in Carrier Sense Multiple Access.
Technical rept.,
Fouad A. Tobagi. 1 Apr 80, 37p TR-187, ARO-16783.1-A-EL
Contract DAAG29-79-C-0138

Existing analysis of the carrier sense multiple access mode (CSMA) has led to the determination of the average channel performance in terms of average throughput and average packet delay. This was achieved by formulating a semi-markovian model for CSMA channels with a finite population of users. In this paper, it is shown that, using the same model, it is possible to derive the actual packet delay distribution. The analysis is similar in nature to that provided for slotted ALOHA channels. These results are useful in the design of systems intended for real time applications such as digitized speech, and in the analysis of multihop packet radio systems. (Author)

AD-A086 450/4 PC **A04**/MF **A01**
Applied Psychological Services Inc Wayne PA Science Center
A Digital Simulation Model of Message Handling in the Tactical Operations System. IV. Model Integration with CASE and SAMTOS.
Final rept. 1 Jul 74-31 Dec 75,
W. Rick Leahy, Arthur I. Siegel, and J. Jay Wolf. Oct 79, 70p ARI-TR-413
Contract DAHC19-75-C-0001
See also AD-A047 105, AD-A045 832 and AD-A081 993.

The human performance oriented computer simulation, called MANMOD, of the U.S. Army's Tactical Operations System (TOS), was modified and extended to allow increased capability and generality. The modifications and extensions included but were not limited to: (1) incorporation of the capability to simulate error message receipt and processing, (2) interaction and integration with a modified CASE model and with the SAMTOS model which principally simulate TOS equipment functions, and (3) implementation of the MANMOD on the Univac 1108 computer system. The modified MANMOD was tested relative to sensitivity and reasonableness of output. The evidence supports the use of the model for a number of functions relative to system design, training requirements and objectives derivation, personnel requirements, and tradeoffs. (Author)

AD-A086 460/3 PC **A07**/MF **A01**
Stein Associates Inc Waltham MA
High Data Rate Communication Program (HIDAR). Volume II.
Final rept. Dec 75-Aug 76.
6 Oct 76, 149p Rept no. 6071-11-VOL-2
Contract N00140-76-C-6264
See also Volume 1, AD-C018 495.

Contents: DOA Accuracy Analysis; Averaging to Reduce Variance in Bearing Estimates; Split-Beam Tracker Accuracy Analysis; Detection of a Message Redundantly Transmitted Over a Fading Channel; Detection of a Message Redundantly Transmitted over a Fading Channel Part 2 - Intercept Analyses; and Processor Sizing.

AD-A086 463/7 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Radio Receiver, Spurious Response. Test Operations Procedure.
Final rept.
12 May 80, 14p Rept no. TOP-6-2-545

This TOP determines and measures the spurious responses of AM/FM radio receivers by using commonly available test instrumentation. It has general applicability to all receivers, including image, intermediate frequency (IF) feed-through, local oscillator related, and extraneously produced spurious responses. Spurious responses are signals propagated at frequencies outside of the tuned principal response frequency to which the receiver responds with measurable output power. They reveal frequencies where the receiver is most susceptible to undesired signals (jamming). (Author)

AD-A086 523/8 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
Fiber Optic Link Design for an Open-Ocean Shallow-Water Tracking Range.
Master's thesis,
David Norman Nicholson, and John P. Powers. Mar 80, 129p Rept no. NPS-62-80-007

This thesis is an investigation into the feasibility of using fiber optics in a shallow-water tracking range at the Naval Undersea Warfare Engineering Station. After a review of the requirements and constraints imposed on the system, a study of optical fiber cables is presented. The engineering parameters for a fiber optic system were reviewed and sample calculations made based on commercially available optical components. The signal formats available for transmission over a fiber optic system were also reviewed. A description of the electronics used to construct one of the possible signal formats and a spread spectrum version of that signal are provided. (Author)

AD-A086 537/8 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Contrast Sensitivity of Circuit Television Systems.
L. A. Shifrin. 5 Jun 80, 6p Rept no. FTD-ID(RS)T-0891-80
Edited trans. of Izvestiya Leningradskogo Electrotekhnicheskogo Instituta (USSR) n98 p131-133 1971, by Victor Mesenzeff.

No abstract available.

AD-A086 655/8 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Bounds on the Utilization of Aloha-Like Multiple-Access Broadcast Channels.
Technical paper,
Pierre A. Humblet. Jun 80, 16p Rept no. LIDS-P-1000
Contract N00014-75-C-1183, ARPA Order-3045
Sponsored in part by Grant NSF-ENG77-19971.

Pippenger's model for synchronous protocols that resolve conflicts among message transmissions on a multiple-access broadcast channel is extended to the case where the transmission times depend on the outcome of the transmissions. An information theoretic method is used to provide new bounds on the utilization of the channel. (Author)

AD-A086 695/4 PC **A05**/MF **A01**
California Univ Los Angeles School of Engineering and Applied Science
Collision-Resolution Algorithms and Random-Access Communications.
Interim rept.,
James L. Massey. Apr 80, 80p Rept no. UCLA-ENG-8016
Contract N00014-78-C-0778

The problem considered is the random-accessing by very many transmitters of a common receiver over a time-slotted collision-type channel with feedback. A collision-resolution algorithm (CRA) is a protocol for the transmission and retransmission of packets such that, after a collision, all transmitters eventually and simultaneously learn that all the colliding packets have been successfully retransmitted. Focus is placed on a CRA due to Capetanakis (the CCRA) and a slight modification thereof (the MCCRA). The fundamental (traffic-independent properties of the CCRA and MCCRA are derived by means of a recursive analysis, with emphasis on the mean and variance of the number of slots required to resolve a collision among N packets. These results are then used to analyze by a Markovian approach the performance of various random-access algorithms, built upon the CCRA and MCCRA, for the case of infinitely many identical sources generating Poisson traffic. The maximum stable throughput is determined for each random-access algorithm, and tight upper and lower bounds are developed for the delay-throughput characteristic of the 'obvious' random-access algorithm built upon the CCRA.

AD-A086 714/3 PC **A05**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
A Predictor Model for SHF and EHF MILSATCOM System Availabilities in the Presence of Rain.
Technical note,
Leonard M. Schwab. 21 Feb 80, 96p Rept no. TN-1980-15
Contract F19628-80-C-0002

A numerical method for computing MILSATCOM system availability based on predicted link availability is described. Link availability can be computed in the model for frequencies of 10-50 GHz, arbitrary geostationary satellite subpoint, and arbitrary value of link margin in dB. Computed availability contours are plotted on a Mercator grid of the world. (Author)

AD-A086 736/6 PC **A04**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Decentralized Algorithms for Optimization of Single Commodity Flows.
Master's thesis,
Isidro Marcos Castineyra. Jun 80, 64p Rept no. LIDS-TH-999
Contract N00014-75-C-1183, ARPA Order-3045

Message routing was studied in a data communication network in which all messages are addressed to the same node of the network. We approach this problem by the minimization of a linear, increasing function of the message flow in the links of the network. In this minimization we consider explicitly the capacities of the links. We present two

algorithms which can be executed in a distributed manner, i.e. the data processing facilities at the nodes of the network cooperate in this minimization by interchanging messages and processing them. One of the algorithms is an adaptation of the primal simplex method of linear programming. The other is an adaptation of D.R. Fulkerson's 'out-of-kilter' algorithm. We give simulation results of the performance of the first algorithm, and a bound on the total number of messages required by the second algorithm.

AD-A086 745/7 PC **A02**/MF **A01**
Johns Hopkins Univ Baltimore MD Dept of Psychology
The Human Use of Telecommunication Systems.
Final rept. 1 Oct 74-30 Jun 80,
Alphonse Chapanis. Jun 80, 24p
Contract N00014-75-C-0131

This report summarizes a series of studies in a research program dealing with interactive communication, conferencing and teleconferencing. The studies fall into three broad classes: (1) a naturalistic study of real conferences in academic, business, and government settings; (2) several laboratory experiments investigating human and system variables in telecommunications; and (3) studies relating to language and language usage in interactive communication and telecommunication. The principal findings of the studies are summarized and integrated and implications are drawn for the design of telecommunication systems. (Author)

AD-A086 746/5 PC **A07**/MF **A01**
Johns Hopkins Univ Baltimore MD Dept of Psychology
Communication Control and Leadership in Telecommunications by Small Groups.
Technical rept.,
Peter D. Pagerey. Jun 80, 138p Rept no. TR-10
Contract N00014-75-C-0131

This experiment examined the effect of communication control on the telecommunications of four-subject problem solving groups, and on the emergence of leaders within the groups. Sixteen four-subject teams solved four realistic problems, one on each of four days, by communicating over a closed-circuit television system with an added audio capacity. Teams were assigned to communication systems which either did or did not have centrally controlled switching so that only one person could talk at a time, and to systems in which either (1) one subject was appointed to perform some of the experimenter's tasks or (2) no group member was so designated. Four degrees of control over communication thus ranged from no control (communication was not centrally switched, no appointed helper) to absolute control (appointed helper who switched the communication). The subject who switched the communication and/or helped the experimenter was chosen at random by the experimenter prior to the start of the first experimental session and remained the same throughout the remaining sessions. Teams were paid a bonus of up to $2.60 for each problem solution. The size of a team's bonus depended on how well the team solved each problem as determined by comparing their solutions with criterion solutions. Dependent measures include the time to solution, a measure of the quality of solution based on the size of the bonus, measures of verbal communication, and questionnaire responses.

AD-A086 767/1 PC **A04**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
A Conflict Resolution Algorithm for Noisy Multiaccess Channels.
Master's thesis,
David Mark Ryter. Jun 80, 75p Rept no. LIDS-TH-1007
Contract N00014-75-C-1183, ARPA Order-3045

An efficient contention resolution scheme has been developed by Gallager to be used in allocating usage of common channel to a large number of independent transmitters. Time is divided into equal size intervals called slots. Message transmissions begin only at slot boundaries and do not overlap boundaries. Depending on the channel history, as monitored by the users, the algorithm defines a system-wide 'transmission interval' at the beginning of each slot. A user can only transmit when it possesses a meassage with a generation time falling at the current transmission interval. This algorithm is modelled as a Markov process. The Gallager algorithm is based on the assumption that the transmitters make no errors in the detection of channel activity. This thesis investigates the case where a limited class of detection errors is introduced into the system. A modified algorithm is proposed to effectively correct these errors. This Noisy Channel Algorithm includes a stack mechanism and two special processing states. The algorithm is again modelled as a Markov process and retains some key features of the Gallager algorithm. The algorithm is analyzed and the degree to which system performance is downgraded by errors is determined. (Author)

AD-A086 768/9 PC **A04**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Network Speech Systems Technology Program.
Annual rept. 1 Oct 78-30 Sep 79,
Clifford J. Weinstein. 30 Sep 79, 61p ESD-TR-79-313
Contract F19628-80-C-0002

This report documents work performed on the DCA-sponsored Network Speech Systems Technology Program. The areas of work are: (1) a switching and multiplexing study dealing with the analysis of buffered voice and data multiplexers and with a proposed technique for exploitation of speech activity detection to increase channel efficiency in a multi-link hybrid network; (2) a Demand-Assignment Multiple Access (DAMA) study focusing on prediction and buffering of digital speech streams for improved speech multiplexing performance on a broadcast satellite; (3) efforts in secure voice conferencing including protocol test and evaluation, support of the Secure Voice and Graphics Conferencing (SVGC) Test and Evaluation Program, and study of potential future-generation conferencing system strategies.

AD-A086 778/8 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Synthesis of MCJ Codes.
Interim rept.,
Hugo M. Beck. 4 Apr 80, 22p NRL-8393, AD-E000 444

Constructive techniques are given for the encoding and decoding of Massey-Costello-Justesen (MCJ) error control block codes. These codes form a family of maximum distance separable (MDS) codes distinct from the Reed-Solomon (RS) codes. The MCJ codes offer ease of encoding and decoding for either hardware or software implementations, based on the more natural Galois ground field mathematical operations involved in the associated algorithms. Because of inherent burst error control capabilities, these codes can be considered for channel error protection as well as for end-to-end message error control.

AD-A086 803/4 PC **A03**/MF **A01**
Technical Training Group (3395th) Keesler AFB MS
Facsimile to Reduce Writer-to-Reader Time.
Final rept.,
Diane Gorzoch. 18 Jul 79, 39p

This paper looks at three terminals, teletypewriter, optical character reader, and facsimile, used to input and output record communications on an electronic transmission medium. It examines the advantages and disadvantages of each in satisfying user requirements and asserts that facsimile, with its flexibility, ease of operation, and user convenience, will emerge as the terminal of the future. (author)

ED-178 030 Not available NTIS
Michigan State Univ., East Lansing. Dept. of Communication.
The Demography of Fictional Television Characters in 1975-76.
Rept. no. 2,
Katrina Wynkoop Simmons. Feb 77, 34p
Contract DHEW-90-C-635
For related documents, see IR-007 415, IR-007 617, IR-007 629-630, and IR-007 634.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This study examines the messages presented by fictional characters during the family hour, later prime time, and Saturday morning television in the 1975-76 season. Demographic variables of program attributes include type of program--family or medical drama, situation comedy, or action-crime; attributes investigated for the fictional characters include sex, age, national origin, accent, ethnic identity, socio-economic status, occupation, program role of the character, and minority characteristics. Findings of the study are presented and discussed, together with some of their implications. A list of references is provided.

ED-178 032 Not available NTIS
Michigan State Univ., East Lansing. Dept. of Communication.
Selective Exposure to Televised Aggression.
Rept. no.7,
Charles K. Atkin. Feb 78, 16p
Sponsored in part by Office of Child Development, Washington, DC. For related documents, see IR-007 415, IR-007 617, IR-007 621, IR-007 629-630, and IR-007 634.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This 2-wave panel survey of young people was conducted to explore the relationship between attitudes and viewing over time, examining aggressiveness and viewing of programs portraying physical and verbal aggression. Questionnaires were administered to 227 children in the fourth, sixth, and eighth grades in 1976 and again one year later. The pertinent variables in this analysis are exposure to physically and verbally aggressive programming, and reports of physical and verbal aggressiveness. Of secondary importance are also measures of program prohibition, grade, and sex. This study provides supportive evidence for selective exposure to aggressive television entertainment programming which is compatible with aggressive attitudinal predispositions. Even with a conservative regression analysis that controls for grade, sex, and initial viewing patterns, a significant relationship remained between prior orientations and subsequent program choices. Findings of this study suggest that a portion of the basic relationship between viewing and aggressiveness may be attributable to selective exposure rather than the reverse viewing-causes-aggression sequence.

ED-178 033 Not available NTIS
Michigan State Univ., East Lansing. Dept. of Communication.
Substance Use and Sexual Intimacy on Commercial Television.
Rept. No.5,
Carlos Fernandez-Collado. Oct 77, 26p
Sponsored in part by Office of Child Development, Washington, DC. For related documents, see IR-007 415, IR-007 617, IR-007 621, and IR-007 629-630.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This study reports a content analysis of 1976-1977 commercial television programming for incidents of alcohol, drug, and tobacco use and sexual behavior. The analysis included one episode of each prime time and Saturday morning dramatic series, comprising 77 programs and 58 hours of television viewing. A concurrent survey among 300 fourth, sixth, and eighth grade children identified the series viewed by 40 percent or more of these children. Substance use and sexual behavior are defined as they relate to this study and findings are discussed. A 23-item bibliography is included.

ED-178 046 Not available NTIS
Market Facts Inc., Washington, DC.
Children's Television Programming and Public Broadcasting: An Analysis and Assessment of Needs.
Final rept.,
Judith W. Seaver, and Stephen J. Weber. Jan 79, 264p
Prepared in cooperation with Corporation for Public Broadcasting, Washington, DC. For a related document, see IR-007 786.

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Designed to serve as a resource book to promote informed decision making by Corporation for Public Broadcasting (CPB) staff and advisory panels, this study reviews and analyzes the topic of children's public television viewing. Both instructional and more general types of programming for children are examined; however, information relevant only for commercial children's television is excluded. Information was collected through interviews, site visits, and reference research, and data are displayed in tabular form throughout the report. Five broad content topics comprise the body of the report: children and television-content analysis, television series for children, program utilization and needs assessment, constituent concerns, and alternatives and options for CPB action. Information sources are listed, and the appendices include a course distribution comparative survey of five national agencies.

ED-178 047 Not available NTIS
Corporation for Public Broadcasting, Washington, DC.
Children's Television Programming and Public Broadcasting: An Analysis and Assessment of Needs. Executive Summary,
Judith W. Seaver, and Stephen J. Weber. Jan 79, 43p
Prepared in cooperation with Market Facts, Washington, DC. For related document, see IR-007 785.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Designed to serve as a resource book to aid decision making by Corporation for Public Broadcasting (CPB) staff and advisory panels, this report consists of a review and analysis of the current state of children's television programming. Major sections of the report are devoted to describing and analyzing children's programming in the public broadcast community, while the remaining portions look at the context in which children and their television series interface. Three general topics are presented to describe this context: the child audience, the ecology of children's television viewing, and definitions of program content. Categories of conclusions used to summarize report findings include information needs, the status of children's television series, and issues. Alternatives and options for CPB action are outlined.

ED-178 053 Not available NTIS
Council of Europe, Strasbourg (France). Committee for Out-of-School Education and Cultural Development.
European Experiments in Cable Television: Local Radio and Video: Lessons to Be Learned and Prospects for the Future. Strasbourg Colloquy, 11-13 May 1977.
May 77, 32p
For related document, see IR-007 804.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This 2-part report summarizes the Council of Europe's 1977 colloquy on cable television, local radio, and video, and presents the chairman's report on media and public usefulness. Problem areas addressed in the section on public service applications of the media include ensuring public access to the media, financing local radio and television, keeping functions separate, establishing a system of control, and research into public needs and communications. A program of action for the European community is proposed and current research in public access to the media currently underway in the various member nations is outlined. The chairman's report examines several factors implicit in public service and the media; pluralistic organization, diversified finance, separation of such functions as production and distribution, coordination and supervision of experiments by ad hoc authorities, and adaptation of experiments to real communication needs.

ED-178 063 Not available NTIS
Media Research and Media Education--Controversy, Contradiction, and Complement,
Raphael Schneller. 1978, 37p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Recent research on mass media, with a particular emphasis on television, is reviewed for the effects that the media has on behavior and the use of media in educational endeavors. Although a very pessimistic view is taken concerning the contribution of specific research studies, it is emphasized that one should not underestimate their importance, for research is seen to have contributed some very important general concepts. The view that television and other mass media have been the irresistible dominator of socialization is heavily exaggerated: one needs to consider many other factors, such as psychological, societal and environmental influences, and the credibility of truth or view of society as presented by mass media has to be questioned seriously and checked. Many of mass media's possibilities, intentions, and limitations could be clarified by understanding not only the media's messages, but also their structure and process through professional, political, and economic considerations.

ED-178 076 Not available NTIS
Council of Europe, Strasbourg (France). Committee for Out-of-School Education and Cultural Development.
Telecommunication Development in the Federal Republic of Germany. The 'Telecommunications Report': Findings, Recommendations and Response,
Manfred Jenke. 10 Nov 76, 48p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This study elaborates on 56 findings and 17 recommendations made in an earlier report about telecommunications by a commission originated by the German Federal Minister for Research and Technology. The commission investigated (1) the needs and demand for telecommunications; (2) technical possibilities, required volume of investment and costs of telecommunications; (3) organization and general terms and conditions of telecommunications. The main outcome of the report was a more accurate knowledge of the technical premises of and interdependencies between the various new forms of telecommunication. In addition, the associated details of needs and the cost estimates made possible a more realistic prognosis of the time scale for the introduction of the corresponding systems. In this discussion of the work of the commission, the views of the Federation and of the States, of political parties, churches and trade unions, industry, advertising, and of the publishers are all considered to identify the complexity of the problems involved. The document canvasses for understanding of the necessity and the difficulty of obtaining a consensus regarding future policy.

ED-178 082 Not available NTIS
International Inst. of Communications, London (England).
The Financing of Community and Public Access Channels on Cable Television Networks in Member Countries of the Council of Europe.
1977, 36p
Sponsored in part by Council of Europe, Strasbourg (France). For a related document, see IR-007 804.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This survey of the current situation in 12 European countries, where cable television has moved from only passive distribution of broadcast signals to the active mode of local origination, includes both official and unofficial discussion about future cable possibilities. The study begins by clarifying the different contexts in which local exploitation of cable arose on each side of the Atlantic, and then considers the situation in those countries where active cable is or has been operational. Each country's experience is described with regard to the opportunities provided by existing broadcasting organizations for public access and/or participation in programming. Particular attention is paid to Great Britain since British cable experiments have continued longer than those in other countries. The issue of financing as a key to control is considered in the context of two questions: whether communities should have a greater share in controlling their own activities, and whether television is too expensive to be afforded at local levels, and thus less amenable to local control and funding than the cheaper medium of radio. The appendix provides an example of U.S. public access programming which has contributed to large profits.

ED-178 083 Not available NTIS
Federal Trade Commission, New York. Bureau of Consumer Protection.
FTC Staff Report on Television Advertising to Children.
Feb 78, 397p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Supt. of Docs.

This report addresses the problems created by the large volume of current television advertising being directed to children, many of whom naively accept the messages and cannot perceive the selling purpose of television advertising or otherwise comprehend or evaluate it; and recommends that lawmaking proceedings begin to (1) ban all television advertising for any product which is directed to very young children, (2) ban advertising directed to older children for sugared products which pose serious dental health risks, and (3) require that advertisements directed to older children for other sugared products be balanced by nutritional and/or health disclosures funded by advertisers. Various sections of the report deal with the factual background of televised advertising to children, including children's exposure to television commercials concerned with sugared foods and commercial impact: legal implications of advertising to children in light of the Federal Trades Commission Act; the absence of jurisdictional or constitutional impediments to the regulation of advertising to children; and remedies available to cure the deceptiveness and unfairness of current advertising to children.

N80-27414/5 PC **A07**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Orbiter S-Band Direct Link System Verification Test Report.
B. K. Vermillion. May 80, 141p NASA-TM-81110, JSC-16680

Space-to-ground S-band communications system compatibility and performance tests were performed for the various radio frequency links. These tests consisted of the various uplink and downlink signal combinations (data rates) for the phase modulation system and both realtime and playback data rates for the frequency modulated downlink systems. In addition, tests involving encryption/decryption, Doppler, and acquisition were performed. Results show that the S-band transponder for the space shuttle orbiter is compatible with the S-band equipment of the AFSCF/RTS (Air Force Satellite Control Facility/Remote Tracking Station). It is also concluded that the performance of the orbiter-AFSCF/RTS direct link exceeds the required performance and that this communications link will meet the system requirements of the Space Transportation System.

N80-27557/1 PC **A15**/MF **A01**
Clarkson Coll. of Technology, Potsdam, NY.
A Microprocessor Based High Speed Packet Switch for Satellite Communications.
Final Report, 15 Apr. 1978 - 30 May 1980.
M. Arozullah, and S. C. Crist. 30 May 80, 347p
NASA-CR-163357
Grant NSG-3191

The architectures of a single processor, a three processor, and a multiple processor system are described. The hardware circuits, and software routines required for implementing the three and multiple processor designs are presented. A bit-slice microprocessor was designed and microprogrammed. Maximum throughput was calculated for all three designs. Queue theoretic models for these three designs were developed and utilized to obtain analytical expressions for the average waiting times, overall average response times and average queue sizes. From these expressions,

graphs were obtained showing the effect on the system performance of a number of design parameters.

N80-27558/9 PC A02/MF A01
Clarkson Coll. of Technology, Potsdam, NY.
A Microprocessor Based High Speed Packet Switch for Satellite Communications, Executive Summary.
Executive Summary Report, 15 Apr. 1978 - 30 May 1980.
M. Arozullah, and S. C. Crist. 30 May 80, 16p
NASA-CR-163357
Grant NSG-3191

The feasibility of using microprocessors to control satellite-borne packet switching was investigated by designing a packet switch architecture suitable for microprocessor control, using 2900 series components to design the processor(s), and evaluating the packet switch in terms of system throughput, delay, and queue sizes without the packet switch. System architecture for one, three, and multiple processors was designed and evaluated. The production cost of the single processor packet switch is estimated at $500,000, excluding cost of development. The three processor version which can support a maximum throughput of 500,000 packets/sec is estimated to have a production cost of under $100,000. For the multiple processor system, cost is believed to be proportional to throughput, with $1,000,000 for 500,000 packets/sec being the proportionality factor.

PAT-APPL-6-028 780 PC A02/MF A01
Department of Energy, Washington, DC.
Communications System Using a Mirror Kept in Outer Space by Electromagnetic Radiation Pressure.
Patent Application,
Filed 10 Apr 79, 17p
Contract E(10-1)-2230
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A communication system is disclosed which uses an electromagnetic energy reflector or mirror kept in outer space by electromagnetic radiation pressure. Using this system line-of-sight electromagnetic wave transmission could be provide to areas lacking line-of-sight broadcasting or ground relay stations without the use of earth orbiting satellites or long cables. In addition, the transmission system could cover large areas of the planet at a lower cost, using less power, and achieving higher efficiency than an earth orbiting satellite and do so without ionospheric interference of signal transmission. (ERA citation 05:029481)

PB80-202393 PC A05/MF A01
Hawaii Univ., Honolulu.
Standards for Computer-Based Message Service.
Final rept.,
Raymond R. Panko. 1979, 91p NBS-GCR-80-210
Contract NB79-NAAB-1587

This report surveys the complex environment in which standards for Computer Based Message Systems and Services must be created -- CBMS design trends, organizational communication needs, technological trends, and the probable industry structure. The report also discusses three major standards areas: message structure, delivery and the user interface.

PB80-202435 PC A06/MF A01
Keewatin Communications, Palo Alto, CA.
The Role of Telecommunications in Socio-Economic Development: A Review of the Literature with Guidelines for Further Investigations.
Heather E. Hudson, Douglas Goldschmidt, Edwin B. Parker, and Andrew Hardy. May 79, 104p
Sponsored in part by International Telecommunication Union, Geneva (Switzerland).

The research evidence concerning the effects of telecommunications (primarily telephones) on social and economic development is reviewed and summarized. The report includes 200 references to relevant sources, including both Western and Eastern European sources as well as North American. Different methodological approaches are discussed in the context of suggestions for further research.

17E. Infrared and Ultraviolet Detection

AD-A086 284/7 PC A12/MF A01
Honeywell Systems and Research Center Minneapolis MN
Human Operator Interface with FLIR Displays.
Final rept. Jun 77-Sep 79,
Larry G. Goble, L. G. Williams, P. D. Pratt, J. Wald, and G. Rubin. Mar 80, 251p 79SRC54, AMRL-TR-79-114
Contract F33615-77-C-0519

This report presents an extensive review of factors which limit performance of forward-looking infrared (FLIR) systems. Two critical variables of system performance, modulation transfer function (MTF) and noise equivalent delta temperature (NE delta T), were chosen for further experimental analysis. The experiment used a digital simulation of minimum resolvable temperature (MRT) paradigm to test two modeled FLIR systems. Detection and recognition data were collected for two targets (four-bar and square) in trials with varying levels of size, contrast, noise, and MTF. The test results were compared with the NVL predictive model(Ratches, et al., 1975) used to evaluate FLIR system performance. (Author)

AD-A086 313/4 Not available NTIS
Naval Research Lab Washington DC
Metal Insulated Semiconductor (MIS) Radiation Effects Considerations for Infrared Focal-Plane Arrays.
J. M. Killiany, and N. S. Saks. 1980, 9p
Availability: Pub. in Society of Photo-Optical Instrumentation Engineers Advances in Focal Plane Technology, v217 p192-200 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 430/6 PC A02/MF A01
Massachusetts Inst of Tech Lexington Lincoln Lab
Real-Time Quasi-Three-Dimensional Display of Infrared Radar Images.
Journal article,
Dorothy R. Sullivan, James S. Martin, and Robert C. Harney. 1979, 12p MS-4858, ESD-TR-79-290
Contract F19628-80-C-0002
Pub. in Proceedings of the Society of Photo-Optical Instrumentation Engineers, v180 p56-65 1979. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A086 439/7 PC A09/MF A01
Kaiser Aerospace and Electronics Corp Palo Alto CA
Development Program for High-Reliability Display IP-722 (XJ-1)AVA-1.
Final rept. 1974-1977,
R. Mulvey, R. Swanteck, and J. Tisdale. Nov 77, 186p TR-77-100, NADC-75321-36
Contract N62269-75-C-0135

The IP-722( ) AVA-1 Analog Display Indicator was redesigned to provide greater reliability, new symbology, easier maintainability, built-in test capability, and FLIR video. Four preproduction units were built in the time fram 1974-1977 and used to verify environmental performance, reliability, maintainability, and flight performance. Some deficiencies were noted during environmental test. These deficiencies were corrected or have been analyzed in sufficient detail to permit rapid correction in the event of production go-ahead. Reliability was demonstrated to be in excess of the specified 445 hours MTBF. Ground and flight tests were conducted on the redesigned unit. The unit demonstrated excellent potential to provide all essential flight and attack information for the all-weather mission of the A-6E TRAM aircraft. (Author)

AD-A086 540/2 PC A03/MF A01
Laser Analytics Inc Bedford MA
Model LS-2X Laser Source Detector Test System.
Final rept.
May 80, 27p
Contract DAAB07-78-C-2465

Proper, characterization of infrared photodiodes requires a series of optical tests that include blackbody response, spatial uniformity, pulse response, and wavelength sensitivity measurements. The results of these optical tests will depend upon many fundamental properties of the detector crystal, namely absorption depth of the radiation, bulk lifetimes of injected carriers, surface recombination effects, carrier drift and diffusion effects, trapping effects and other mechanisms. Some of these effects are not clearly understood but may play important roles in such application as high speed pulse detectors, laser heterodyne receivers, or large area high resolution detector arrays. Spears has shown that proper spatial and temporal characterization of HgCdTe CO2 laser heterodyne receivers must be done at the operating frequencies. A realistic characterization of the pulse response of an infrared detector must be made at the operating wavelength, generally that of peak detector response. Certain fixed frequency gas lasers such as CO2, CO, or HF can provide sufficient power and speed for detector characterization but they have limited wavelength coverage and are often cumbersome to use. On the other hand, Pb-salt tunable diode lasers can provide more than 100 micro w of power emitted from nearly a point source, subnanosecond risetime pulses and wavelength selectability between 2.8 and 30 micrometers. These characteristics make diode lasers an ideal source for pulse spatial response measurements of infrared detectors.

AD-A086 752/3 PC A04/MF A01
Westinghouse Defense and Electronic Systems Center Baltimore MD Systems Development Div
Intelligent Tracking Techniques.
Quarterly rept. no. 4, 1 Jul-30 Sep 79,
Thomas J. Willett. 30 Sep 79, 72p
Contract DAAK70-78-C-0167

This is the Fourth quarterly Report under a contract to investigate the design, test, and implementation of a set of algorithms to perform intelligent tracking and intelligent target homing on FLIR and TV imagery. The intelligent tracker will monitor the entire field of view, detect and classify targets, perform multiple target tracking and predict changes in target signature prior to the target's entry into an obscuration. The intelligent tracking and homing system will also perform target prioritization and critical aimpoint selection. A system concept was developed for intelligent homing and aimpoint selection. The problem was divided into long range homing and aimpoint selection. Sets of 875-line FLIR imagery were extracted from the NV&EOL data base and examples were presented for both categories. The subjects of close-in homing and aimpoint selection were further divided into close-in segmentation, close-in target tracking, and tracking during the transition from long range to close-in. (Author)

AD-A086 773/9 PC A04/MF A01
Army Armament Research and Development Command Aberdeen Proving Ground MD Chemical Systems Lab
Infrared Transmission through Screening Smokes: Experimental Considerations.
Technical rept. Aug 78-Aug 79,
Gerald C. Holst. May 80, 52p ARCSL-TR-80004, AD-E410 280

Presented are the basic principles that the experimentalists should consider before measuring the infrared transmission of an aerosol. Three basic methods are examined: laser transmissometers, broadband radiometer-transmissometers, and thermal imaging systems. The effects of single and multiple scattering and receiver field of view are discussed. Aerosol coagulation and sedimentation are considered. The effects of the spectral properties of the detector response, atmospheric transmission, and source temperature are related to the measured transmission. This can differ significantly from the true aerosol transmission. When using a thermal imaging system, the amount of smoke necessary to obscure a target depends upon whether the thermal system has an automatic gain

control. Furthermore, the amount of smoke necessary depends upon the angular subtense of the target. All of the experimental problems discussed are shown graphically in three flow charts.

PB80-200934 PC **A02**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
Application of Interframe Filtering to Line Scanned Infrared Imaging Systems.
Technical memo.,
G. V. Poropat. Nov 79, 24p ERL-0112-TM, AR-001-927

The use of frame storage in an imaging system to implement interframe filtering is analyzed and its effects on image signal to noise ratio is determined. Simulation of interframe processing on imagery obtained using an AGA Thermovision is described. The application of interframe filtering to real time imaging systems is examined.

17G. Navigation and Guidance

AD-A086 510/5 PC **A06**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. SSILS Initial Evaluation Report, AN/GRN-29 Runway 16, Dyess AFB, Texas, 31 January-26 February 1980.
Final rept.,
Joseph P. Coyle, and David E. Thibodeau. 16 Jun 80, 113p Rept no. 80/66N-202

This report presents the results of the 31 January - 26 February 1980 Traffic Control and Landing Systems (TRACALS) Evaluation of the Dyess AFB AN/GRN-29(V) SSILS serving Runway 16. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening, or operational use. (Author)

AD-A086 535/2 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Theory of a Gyrovertical Compass,
A. Yu. Ishlinskiy. 13 Jun 80, 34p Rept no. FTD-ID(RS)T-0926-80
Edited trans. of Prikladnaya Matematika i Mekhanika (USSR) v20 n4 p487-499 1956, by Carol S. Nack.

No abstract available.

AD-A086 539/4 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Equations of the Problem of Determining the Location of a Moving Object by Gyroscopes and Accelerometers,
A. Yu. Ishlinskiy. 13 Jun 80, 40p Rept no. FTD-ID(RS)T-0925-80
Edited trans. of Prikladnaya Matematika i Mekhanika (USSR) v21 n6 p725-739 1957, by Carol S. Nack.

No abstract available.

AD-A086 602/0 PC **A02**/MF **A01**
ORINCON Corp La Jolla CA
A Score for Correct Data Association in Multi-Target Tracking,
D. L. Alspach, and R. N. Lobbia. 1979, 6p
Contract N00014-77-C-0296
Presented at Decision and Control Conference, Fort Lauderdale, FL, Dec 79.

In the real-world multi-target tracking problem, there exists the possibility for many things to go wrong. Typical problems which arise include: too few tracks are formed; too many tracks are formed (false tracks); and inaccurate position, course, and speed estimates are reported. The above difficulties are often the result of incorrect allocation of data to individual tracks. Algorithms, while estimating the motion of a given target, inadvertently mix in clutter and/or measurements from another target. In order for correct allocation of data to a given track to be made, one must have an effective scoring formula; that is, some means of determining how likely a given assignment of data is. To be effective, a scoring formula must produce (on the average) a better score for correct assignments than for incorrect assignments. Information useful in the scoring process includes a priori intelligence data (such as initial target locations), models of target motion, models of the transmission channel, and expected moments of clutter for the sensor gain setting being used. Basically, the score is derived from the residuals which come out of the processing of a batch of data with extended Kalman filter. This is used to evaluate the likelihood of potential tracks. although the 'likelihood' has an intuitive meanding, the term is used here to mean the probability density fucntion p(lambda) of the track lambda. The expected cost of a given assignment is derived with the theory of extermals being used to obtain the expected cost of adding a clutter point in a track. The resulting expected cost is then shown to behave in a quantitative fasion and this can be visualized from a geometric viewpoint. (Author)

AD-A086 683/0 PC **A08**/MF **A01**
Analytic Sciences Corp Reading MA
Development of Loran-C Data Collection and Analysis Procedures.
Final rept. Dec 79-Feb 80,
Leon M. DePalma, Edward A. Schoen, and Stephen F. Donnelly. Mar 80, 175p TASC-TR-1021-1, FAA-RD-80-48
Contract DOT-FA79WA-4271

A unified data collection and analysis plan to support NAFEC and the FAA in the assessment of Loran-C as either a replacement for or supplement to the current network of VOR/DMEs is presented. This effort focused on four specific areas: Developing mathematical models of temporal variations in Loran-C signal phase and amplitude; Developing data collection procedures to enable an assessment of the accuracy and adequacy of proposed models; Defining a data analysis plan that will enable maximum use of the data collected in identifying parameters of the proposed models and cause and effect relationships of Loran-C temporal variations; and Defining a plan for the design of a data management system for the storage and maintenance of collected data and an efficient interface for the data analysis programs. The plans and models provide the necessary structure for the data collection and analysis effort anticipated to commence early in 1980. Subsequent analysis of the Loran-C data will validate the models and dictate any modifications of the plans.

AD-A086 702/8 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AGCS) Scott AFB IL
Tracals Evaluation Report. Communications Initial Evaluation Report, Keesler AFB, Mississippi, 10-15 March 1980.
Final rept.,
Paul F. Finkes, Jr., and Phillip M. Dermody. 15 May 80, 80p Rept no. 80/66C-204

The purpose of the evaluation was to define the capabilities and limitations of the reconfigured ATC communications system. Included in this report are the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communications system until there is a deletion, addition, relocation of equipment, or a change in the horizon profile.

AD-A086 705/1 MF **A01**
Naval Ocean Systems Center San Diego CA
High Torque-to-Inertia Servo System for Stabilizing Sensor Systems. Candidate Systems Include Missile Guidance, Surveillance, and Tracking.
Final rept. Jul 79-Jan 80,
F. Dale Groutage. Apr 80, 275p Rept no. NOSC/TR-527
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This is a technical report on the design and development of a high torque-to-inertia servo system for stabilizing a sensor system. The design philosophy leads to a low cost/high performance system. The stabilizing element developed is universal and has application for missile guidance, surveillance, and tracking sensor systems. The servo design is based on math models and is used to develop performance specifications and perform evaluations. (Author)

AD-A086 717/6 PC **A04**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. TACAN Initial Evaluation Report, England AFB, Louisiana, 17-31 March 1980.
Final rept.,
Harvey J. Leister, and Peter W. Stegmann. 28 Apr 80, 70p Rept no. 80/66N-206

This report presents the results of the 17-31 March 1980 TRACALS Evaluation of the England AN/GRN-20C TACAN. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. This report includes an analysis of facility coverage and standard nulling conditions. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening, or operational use. (Author)

AD-A086 718/4 PC **A06**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. AN/GRN-29 SSILS Initial Evaluation Report, England AFB, Louisiana, 17-31 March 1980.
Final rept.,
Harvey J. Leister, and Darrell W. Miller. 2 Jun 80, 109p Rept no. 80/66N-207

This report presents the results of the 17-31 March 1980 TRACALS Evaluation of the England AN/GRN-29 SSILS serving Runway 32. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening or operational use.

AD-A086 790/3 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
An Algorithm for Position Determination Using Loran-C Triplets with a Basic Program for the Commodore 2001 Microcomputer.
Technical rept.,
Rex H. Shudde. Mar 80, 38p Rept no. NPS55-80-009

An algorithm for position determination using Loran-C triplets and an implementation of the algorithm in the BASIC language of the commodore 2001 microcomputer are presented. Modifications of the geodesic direct solution and reverse solution algorithms of P. D. Thomas are also presented; these modifications eliminate all the special positioning and quadrant determination requirements of the original algorithms. (Author)

AD-A086 802/6 PC **A03**/MF **A01**
Teledyne Geotech Alexandria VA Seismic Data Analysis Center
Seismic Data Analysis Center Final Report.
Final technical rept. 1 Oct 78-30 Sep 77,
Robert R. Blandford. 17 Jul 78, 43p Rept no. SDAC-TR-78-7
Contract F08606-77-C-0014, DARPA Order-2551

The objectives of this work were to: (1) operate, program, and maintain real time and batch processors; (2) provide services to other government agencies and VELA participants; (3) conduct research in seismology; and (4) develop systems to control and process seismic information generated by remote stations in the Expanded VELA Seismic Network. Network development tasks included refining and developing the Detection Processing System (DPS) and completing efforts to make the Network Event Processor fully operational. (Author)

AD-A086 823/2 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA

Position Determination With Loran-C Triplets and the Hewlett-Packard HP-67/97 Programmable Calculators.
Technical rept.,
Rex H. Shudde. Mar 80, 55p Rept no. NPS55-80-010
See also AD-A086 790.

This report presents an algorithm and HP-67/97 programs for position determination with Loran-C chains. Operational data cards are prepared in advance for Loran-C triplets. Position determination is performed using a single program card and an appropriate operational data card. (Author)

AD-A086 833/1 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Communications Initial Evaluation Report, K. I. Sawyer AFB, Michigan, 22-29 April 1980.
Final rept.,
Allen C. Mathews, and Donald J. Ambrose. 11 Jun 80, 96p Rept no. 80/66C-212

A Communications Initial Evaluation was performed at K.I. Sawyer AFB, Michigan from 22-29 April 1980. The purpose of the evaluation was to define the capabilities and limitations of the ATC communications system. Included in this report are the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communications system until there is a deletion, addition, relocation of equipment, or a change in the horizon profile. (Author)

17H. Optical Detection

PAT-APPL-6-050 860 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Isotropically Sensitive Optical Filter Employing Atomic Resonance Transitions.
Patent Application,
J. B. Marling. Filed 21 Jun 79, 17p
Contract W-7405-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An ultra-high Q isotropically sensitive optical filter or optical detector is disclosed employing atomic resonance transitions. More specifically, atomic resonance transitions utilized in conjunction with two optical bandpass filters provide an optical detector having a wide field of view (approx. 2 pi steradians) and very narrow acceptance bandwidth approaching 0.01A. A light signal to be detected is transmitted through an outer bandpass filter into a resonantly absorbing atomic vapor, the excited atomic vapor than providing a fluorescence signal at a different wavelength which is transmitted through an inner bandpass filters have no common transmission band, therby resulting in complete blockage of all optical signals that are not resonantly shifted in wavelength by the intervening atomic vapor. Two embodiments are disclosed, one in which the light signal raises atoms contained in the atomic vapor from the ground state to an excited state from which fluorescence occurs, and the other in which a pump laser is used to raise the atoms in the ground state to a first excited state from which the light signal then is resonantly absorbed, thereby raising the atoms to a second excited state from which fluorescence occurs. A specific application is described in which an optical detector according to the present invention can be located in an orbiting satellite. (ERA citation 05:029482)

SAND-79-0489 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Terrain Effects on Line of Sight (Ground-to-Air) in the Fulda Gap Area.
Y. T. Lin. Jul 79, 41p
Contract EY-76-C-04-0789

Probability on line-of-sight detection from the ground to aircraft at various heights was estimated using Defense Mapping Agency's digitized terrain data of the Fulda Gap area of West Germany. Effects of forests on the line of sight are included. Analysis of line-of-sight visibility on the road is discussed, and an example using probability of line of sight is presented. 22 figures. (ERA citation 05:002347)

17I. Radar Detection

AD-A086 787/9 PC **A03**/MF **A01**
Naval Research Lab Washington DC
A New Class of Pulse Compression Codes and Techniques.
Interim rept.,
B. L. Lewis, and F. F. Kretschmer. 26 Mar 80, 27p NRL-8387, AD-E000 442

A new class of symmetrical polyphase codes is introduced that promises to be very useful in pulse expander-compressor circuits for radar systems. These codes are very compatible with digital signal processing techniques. The code symmetry permits digital pulse expander-compressors to be implemented with less hardware than required with any previously known code. Another significant advantage of the new codes is that precompression bandwidth limiting such as normally would be found in any well-designed radar actually improves the mainlobe to sidelobe ratios obtainable with the new codes while it degrades that obtainable with the previously known Frank code.

AD-A086 788/7 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Preliminary Results of Radar Environmental Mapping.
Interim rept.,
B. H. Cantrell. 28 Apr 80, 22p NRL-8400, AD-E000 440

The signals received by radars often contain much more information than the echoes from targets, but usually only the target echoes are extracted. Means of extracting the environmental conditions such as rain and land clutter, noise jamming, short-pulse interference, and thermal-noise regions are studied. The knowledge of the environmental conditions is thought to be useful in target tracking and radar control processes.

AD-A086 846/3 PC **A03**/MF **A01**
Kansas Univ/Center for Research Inc Lawrence
Analytical Study of the Bistatic Radar Cross-Section of a Prolate Spheroid.
Final rept. 1 May 79-1 Feb 80,
Albert W. Biggs, and Stanton B. McMillian. Mar 80, 37p AFOSR-TR-80-0532
Grant AFOSR-79-0105

Bistatic radar has important application in strategic and tactical space surveillance and in weapon tracking. At the present time, there is a lack of standard techniques for measuring radar cross sections. This effort was a feasibility study into obtaining an exact radar cross section for the Advanced Strategic Air Launched Missile (ASALM). The study was limited to the bistatic cross-section of a typical target. A prolate spheroid was selected because it resembles an air cruise missile. Results were configured in the form of bistatic cross-sections with a computer program to generate additional cross-sections for prolate spheroids with different major to minor axis ratios. Any surface that is convex at each point, and which has no two distinct points where the outward normal vectors are in the same direction, can be handled similarly. Hence, the program written could very quickly be changed to handle a figure that is ellipsoidal in all the major planes, or even a parabola of revolution that extends to infinity in one direction. It is simple a matter of being able mathematically to describe the surface. (Author)

AD-A086 858/8 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Radio-Echo Sounding in the Allan Hills, Antarctica, in Support of the Meteorite Field Program.
Special rept.,
Austin Kovacs. May 80, 12p Rept no. CRREL-SR-80-23
Grant NSF-DPP77-19565

Radio-echo sounding measurements made on Ross Island and in the Allan Hills Antarctica indicate that radio-echo sounding may offer the unique possibility of detecting a buried meteorite in glacial ice. The results also revealed internal layering within the snow on Ross Island and in the snow filling an ice depression west of Allan Nunatak. Radio-echo sounding also gave the depth to bedrock near the west side of Allan Nunatak. The greatest ice depth measured was 310 m. (Author)

PB80-203904 PC **A04**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
Radar Emitter Recognition Using Pulse Repetition Interval.
Technical rept.,
R. M. Hawkes. Mar 80, 60p ERL-0132-TR, AR-001-976

A method for estimating radar emitter pulse repetition interval parameters from intercepted emissions is presented. Adaptive parameter estimates based on certain measurements are derived. The measurement are obtained by a readily implementable observation procedure. The approach can deal with emitters with variable pulse repetition interval in a dense environment. Computer simulation results for the techniques are included.

17J. Seismic Detection

AD-A086 464/5 PC **A20**/MF **A01**
Teledyne Geotech Alexandria VA Alexandria Labs
Studies of Seismic Wave Characteristics at Regional Distances.
Final rept.,
Robert Van Nostrand. 26 Feb 80, 459p AL-80-1, AFOSR-TR-80-0518
Contract F49620-79-C-0031, ARPA Order-3291

This report contains two volumes, each of which is a compendium of individual studies. Volume I contains three reports dealing with the effect of the crust on the amplitudes of the regional phases Pg and Lg and on array design. Volume II contains six reports. Three of these concern the analysis of regional phases recorded in Alaska. The remaining three relate crustal structure to the character of regional phases.

18.

NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

CLM-R-179 PC **A04**/MF **A01**
UKAEA, Abingdon (England). Culham Lab.
DITE Tokamak Multi-Pulse Thomson Scattering System.
R. Prentice. May 78, 52p
U.S. Sales Only.

A four pulse ruby laser scattering system for measuring electron temperature and density in a tokamak plasma is discussed in detail. It is shown that the divergence of the laser has to be adequately controlled. By using notch filters to eliminate the stray laser light, instead of baffles, measurements can be performed at any position over a large fraction of the minor diameter of the plasma. The transmission of the detecting system was opti-

mised using a computer ray tracing programme. Results from the apparatus are shown to be in substantial agreement with those obtained using other techniques. (Atomindex citation 10:428206)

CLM-R-182 PC **A02**/MF **A01**
UKAEA, Abingdon (England). Culham Lab.
Results of Monte-Carlo Studies on Backscattering and Sputtering from 'Pocket' and 'Finned' Structures.
K. P. Brown. Jan 78, 12p
U.S. Sales Only.

A Monte-Carlo computer program which has been developed for studying backscattering and sputtering processes involving high energy particles in complex vacuum structures has been used to show that useful reductions in backscattering and sputtering can be achieved by pocketing or finning the wall surfaces of plasma containment vessels. (Atomindex citation 10:428087)

CLM-R-184 PC **A02**/MF **A01**
UKAEA, Abingdon (England). Culham Lab.
Design of the Segment Structure and Coolant Ducts for a Fusion Reactor Blanket and Shield.
D. A. Briaris, and J. R. Stanbridge. May 78, 17p
U.S. Sales Only.

An outline design and analysis of a support structure for the replaceable first wall of a helium cooled fusion reactor blanket has been undertaken. The proposed structure supports all the segment gravitational loads with maximum deflections limited to < 10 mm, and is itself supported off the outer shield by a simple vee-in-groove arrangement. It is a feature of the design that the coaxial coolant pipes and the segment structure operate at the same temperature, making it possible for them to be integrated, thereby avoiding the necessity for pipe bellows. The requirements of cooling the inner arm of the structure and increasing the major radius of the torus by approximately = 0.5 m, have been identified as problems associated with the 'horseshoe' shaped structure applicable to the reactor with divertor. For a ring structure, i.e. reactor without divertor, these problems do not arise. (Atomindex citation 10:428086)

CLM-R-193 PC **A02**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
Laser Driven Pellet Refuelling for JET (and Reactor) Uses.
I. J. Spalding. Nov 78, 14p
U.S. Sales Only.

Published estimates of pellet sizes and velocities required to refuel JET and post-JET experiments are summarized. Possible advantages and difficulties of accelerating solid, unconstrained hydrogenic (and also jacketed) pellets to these velocities using laser techniques are then discussed. An essential problem to be solved is adequate axial guidance of the pellet during its acceleration, since laser pulse durations of many sound-transit times (in the solid D sub 2) are necessary to avoid shock-heating the pellet. It is shown that Culham's multikilojoule CO sub 2 TROJAN laser facility is well suited to testing many of the concepts proposed. In particular it is shown that successful verification, and subsequent optimization, of such (novel) techniques would permit single shot tests of contemporary pellet ablation theories by the injection of approximately 1 mm diameter D sub 2 pellets at velocities <= 10 exp 6 cm s exp -1 into the JET plasma. Means for scaling these techniques to repetition rates of order 10 Hz, and to the 1 cm pellet diameters possibly required in a working Tokamak reactor, are also discussed. (Atomindex citation 11:503841)

CLM-R-194 PC **A03**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
Small Ignition Tokamak with Neutral Beam Additional Heating.
J. J. Field, E. Minardi, and E. Salpietro. Nov 78, 30p
U.S. Sales Only.

The two most successful Tokamaks currently in operation are PLT and Alcator, the former achieving the highest temperatures and the latter the highest value of ntausub(E). Transport calculations are presented for a small ignition Tokamak (SIT) which it is envisaged to operate with intense neutral injection heating, like PLT, and with a high field, high current density and high particle density, like Alcator. Besides the the physics of such a device some technological considerations are included based mainly on the design of the Frascati Tokamak. (Atomindex citation 11:503772)

CLM-R-196 PC **A05**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
Magnetic Divertors for Experimental Tokamaks and Fusion Reactors.
P. E. Stott. Jan 79, 76p
U.S. Sales Only.

Brief reports of working group discussions. These covered the requirements for a divertor in a fusion reactor including reducing impurities, exhausting the plasma and controlling the plasma-wall interactions. Divertor configurations were also reviewed and their merits and disadvantages compared. Existing divertor experiments were summarised and recommendations for further work made. Then the problems anticipated in designing a divertor for a conceptual reactor were considered. The physics of divertors and the scrape-off layer was discussed with reference to present models of plasma in divertors. Finally, experiments needed to demonstrate the feasibility of divertors for reactors and the development of specialised diagnostics for such experiments were considered. (Atomindex citation 11:503845)

CLM-R-197 PC **A02**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
Pulsed Tokamak Reactor Study.
W. R. Spears, and R. Hancox. Jul 79, 12p
U.S. Sales Only.

This report considers the choice of parameters for a pulsed Tokamak reactor with net electrical output of 600 MWe. The physics and engineering assumptions are described in detail with particular emphasis on the magnetic field design. This leads to reactor parameters with 2 m minor radius, an aspect ratio of 3.9 and energy multiplication factor Q of 13. The sensitivity of the chosen parameters to various changes in the assumption is analysed. A comparison is made with a recent study of the Reversed Field Pinch Reactor, showing that the two containment systems appear to have similar potential as fusion power sources. (Atomindex citation 11:503842)

CONF-791058-74 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Integral Experiments for Fusion Reactor Design: Analysis.
R. T. Santoro, R. G. Alsmiller, Jr., J. M. Barnes, and E. M. Oblow. 1979, 3p
Contract W-7405-ENG-26
International conference on nuclear cross sections for technology, Knoxville, TN, USA, 22 Oct 1979.

Integral experiments that measure the energy spectra of neutrons and gamma rays due to the transport of approx. 14 MeV D-T neutrons through laminated SS-304 and borated polyethylene shield assemblies have been performed. Measured and calculated energy spectra and integrated flux distributions are compared for a typical shield assembly as a function of detector location. (ERA citation 05:025084)

CONF-791102-171 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Direct Cryosorption Pumping of an Energetic Hydrogen Ion Beam.
S. W. Schwenterly, P. M. Ryan, and C. C. Tsai. 1979, 5p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Cryosorption pumps (CSP) are a prime candidate for the pumping of helium and deuterium-tritium (D-T) in tokamak divertor systems and may also see service in neutral beam injectors. However, the ability of a CSP to take high energy ions escaping from a plasma or neutral beam has not previously been demonstrated. In this study we arranged a 10-cm ion source of the type used in the Oak Ridge Tokamak (ORMAK) to inject a beam of ions directly into the inlet of a CSP. The pump contained two chevron baffles at 100K and 15K as well as a 15K cryosorption surface covered with a type 5A molecular sieve. The cryosurfaces were cooled by a closed-cycle helium refrigerator. For hydrogen ion pulses up to 11.5-keV energy and 1.3-A current, the pressure maintained during the pulse was only a few percent higher than that maintained with an equal flow of cold neutral gas. Pulse lengths of 100-300 ms were used. Calorimetric measurements showed that 40-60% of the kW power was incident on the pump inlet. Cool-down and regeneration behavior of the pump will also be discussed. (ERA citation 05:025087)

COO-2218-160 PC **A05**/MF **A01**
Illinois Univ. at Urbana-Champaign. Fusion Studies Lab.
Cyclotron Radiation by a Multi-Group Method.
T. C. Chu. 1980, 86p
Contract AC02-76ET52040

A multi-energy group technique is developed to study conditions under which cyclotron radiation emission can shift a Maxwellian electron distribution into a non-Maxwellian; and if the electron distribution is non-Maxwellian, to study the rate of cyclotron radiation emission as compared to that emitted by a Maxwellian having the same mean electron density and energy. The assumptions in this study are: the electrons should be in an isotropic medium and the magnetic field should be uniform. The multi-group technique is coupled into a multi-group Fokker-Planck computer code to study electron behavior under the influence of cyclotron radiation emission in a self-consistent fashion. Several non-Maxwellian distributions were simulated to compare their cyclotron emissions with the corresponding energy and number density equivalent Maxwellian distributions. (ERA citation 05:025011)

EUR-5735 PC **A04**/MF **A01**
Computer Predictions for Future Tokamaks.
H. Knoepfel, and Sept 76, 73p CONF-76099-4
School on tokamak reactors for breakeven, Erice, Italy, 21 Sep 1976.

Proceeding from a reasonable agreement with existing experimental results, this lecture presents radial particle and energy transport computations which extrapolate to large (up to reactor dimensions) future Tokamaks. Special consideration is given to the behavior of alpha-particles, the influence of high-z impurities, and the thermal stability of the plasma. (Atomindex citation 10:422344)

HEDL-SA-1889-FP MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Deposition and Control of exp 7 Be in Liquid Lithium.
R. A. Bechtold. 1980, 8p CONF-800401-12
Contract AC14-76FF02170
International conference of liquid metal technology for energy systems, Richland, WA, USA, 20 Apr 1980.
Microfiche copies only.

Preferential beryllium-7 deposition has been found in the higher temperature region of non-isothermal flowing lithium between 270 exp 0 C to 200 exp 0 C. Various methods for controlling exp 7 Be distribution for application to the Fusion Materials Irradiation Test (FMIT) facility are examined. Flushing a loop with 425 exp 0 C lithium decreased exp 7 Be activity on pipe walls by 60 to 80%. Yttrium has been found to be more effective than the other materials tested for removal of exp 7 Be from lithium. Preliminary results on diffusion traps indicate effectiveness for exp 7 Be removal also. (ERA citation 05:025090)

IAE-2898 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
IBM-5 Ion Source Without an External Magnetic Field.
V. M. Kulygin, A. A. Panasenkov, N. N. Semashko, and I. A. Chukhin. 1977, 17p
In Russian.
U.S. Sales Only.

In controlled fusion research one of the chief problems is the injection of power beams of fast hydro-

gen atoms into magnetic traps. The development of effective injectors depends largely on the progress in the design of high-current ion source modules. In this relation the paper gives a description of a specific large-area plasma emitter by means of a low-voltage diffusion discharge in a discharge chamber with a distributed cathode without an external magnetic field. Ion selection and beam shaping are effected by means of a three-electrode multi-slit ion-optical system. The IBM-5 ion source (nonmagnetic ion module) design is described, which is intended to be used in the T-11 tokamak injector. IBM-5 allows to obtain hydrogen ions with energies of up to 25 keV, current of more than 30 A, and pulse duration of 20 ms. When it will be used in the T-11 tokamak, an atom flux up to 320 kW at particle energy of 20 keV or up to 500 kW at particle energy of 25 keV can be injected into the device. (Atomindex citation 10:428166)

IAE-2953 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Theory of Ballooning Modes in Tokamak Devices with High beta.
A. B. Mikhailovskii. 1978, 14p
In Russian.
U.S. Sales Only.

General problems of the theory of small-scale MHD instabilities of a tokamak with large beta are considered. Two important problems have been solved i.e., that connected with the evaluation of relative importance of ballooning modes and the Seidem perturbations, and the second one touching the substance of the Mersieur criterion at large beta . At rather general suppositions it is shown that the Mersieur stability criterion is a sufficient criterion of the stability of ballooning modes. It is stated that the Mersieur criterion is not fulfilled at beta (>=)a/Rq exp 2 , where a, R are the small and large tokamak radii, q is the reserve coefficient. The correspondence of this result and those of computer experiments also giving evidence on instability at beta (> approximately) a/Rq exp 2 is considered. (Atomindex citation 10:428184)

IAE-3025 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
"Frequency Capture" of the Plasma Helical Instability in a Tokamak.
N. V. Ivanov. 1978, 9p
In Russian.
U.S. Sales Only.

Presented are considerations of the possible plasma helical instability "frequency capture" mechanism in a tokamak by the external variable magnetic field. Frequency dependences of the "capture" threshold and of phases and amplitudes of "captured" mode as well are calculated for the forced wave model with the fixed amplitude. Calculation results are compared with the experimental data, obtained at ATC tokamak. (Atomindex citation 10:428146)

INIS-mf-5363 PC **A06**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Theoretical Study of Plasma Instabilities in a Tokamak-Reactor. Review.
A. B. Mikhailovskii. 1978, 103p
In Russian.
U.S. Sales Only.

The results of the theoretical study of plasma instabilities in a tokamak reactor are summarized. Special attention is paid to the following questions: instabilities on trapped ions, drift waves and modes on trapped electrons, nonpotential instabilities of the tokamak with a plasma of high pressure, tokamak instabilities with the injection of fast neutrals, thermonuclear instabilities. The results of the experiments carried out in 1965-1978 are presented. (Atomindex citation 11:495623)

IPP-4/178 PC **A05**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Scoping Studies for the Layout of INTOR.
K. Borrass, and R. Buende. May 79, 81p
U.S. Sales Only.

A reference system layout for an INTOR-like device is performed on the basis of a zero-dimensional, time-dependent tokamak model. Emphasis is placed on the description of the complete, reactor-relevant burn cycle. Novel results on dynamic burn control by cyclic major radius compression and decompression are reported. The temporal behaviour of all key quantities of the reference system is given for various assumptions on impurity behaviour. Sensitivity studies are performed in two steps. The first is the calculation of all data that characterize the operation of all components of the plant at a reference layout point. The second step is to calculate the influence exerted by the variation of uncertain parameters on the operation of the plant, assuming that the plant has already been built according to the reference layout. (Atomindex citation 11:503747)

JAERI-M-7610 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Recent Results in the DIVA Experiment.
Mar 78, 72p
U.S. Sales Only.

Divertor effects have been studied over a wide range of plasma parameters: electron temperature T sub(eo) = 200 - 700 eV, ion temperature T sub(io) = 60 - 300 eV and density n sub(eo) = (1.5 - 8.0) x 10 exp 13 cm exp -3 in the main plasma, and T sub(es) = 20 - 100 eV, T sub(is) = 20 - 60 eV and n sub(es) = (1.5 - 5.0) x 10 exp 12 cm exp - 3 in the scrape-off layer plasma. The following results are obtained. 1) The divertor reduces plasma-wall interactions near the main plasma by guiding loss plasma into the divertor chamber. A maximum divertor efficiency is 35% for particle flux and 75% for heat flux. 2) The scrape-off layer plasma shields impurity influx, guides ionized impurities into the divertor, and reduces influx of injected impurities into the main plasma by a factor of 2 - 4. Shielding efficiency is higher for aluminum than for carbon. Shielding effect is also observed in a conventional discharge. 3) The divertor reduces radiation loss by a factor of 2 - 4 and hence increases the energy-confinement time by a factor of 2.5. 4) The divertor does not significantly affect particle-confinement time, ion temperature and heat diffusion coefficient. 5) The radiation loss due to pseudo continuum mainly from gold ions is comparable to that due to oxygen lines. Impurity confinement time is comparable to the average particle-confinement time. 6) The particle flow velocity is a few times less than the sound velocity, the heat transmission rate is consistent with a sheath model, and the particle diffusion coefficient in the scrape-off layer is about ten times less than the Bohm diffusion coefficient. Scaling for electron temperature is obtained. 7) Ion sputtering, arcing and evaporation are identified. The ion sputtering by impurity ions is the dominant process of metallic impurity release from a limiter or a neutralizer plate in a stable discharge. (Atomindex citation 10:428148)

JAERI-M-8186 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
MEDUSA-PIJ: A Code for One-Dimensional Laser Fusion Analysis Taking Account of Neutron Heating Effect.
H. Takano, and Y. Ishiguro. Mar 79, 33p
U.S. Sales Only.

In the one-dimensional Lagrangian hydro-burn code MEDUSA, the neutrons emitted by D-T and D-D reactions are assumed to escape freely from the system without further interaction. The assumption is not practicable, however, in plasmas highly compressed by laser irradiation. In the modified code MEDUSA-PIJ, the energy deposition due to the emitted neutrons is calculated by collision probability method. The total energy deposition is considered in the energy balance equation of the system at each time step, and a hydrodynamic equation is solved. Neutron spectra escaping from fuel sphere are calculated by a neutron slowing-down equation derived under the two-collision model. The MEDUSA-PIJ code is designed for FACOM-230/75 computer with a FORTRAN IV H-level compiler. (Atomindex citation 11:497533)

LA-UR-79-2971 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Tritium Systems Test Assembly: Objectives and Design.
J. L. Anderson. 1980, 3p CONF-800707-1
Contract W-7405-ENG-36
International conference on plasma physics and controlled nuclear fusion research, Brussels, Belgium, 1 Jul 1980.

The principal program objectives for TSTA are: (1) to develop and demonstrate the fuel cycle for fusion power reactors; (2) to develop and test environmental and personnel protective systems; (3) to develop, test, and qualify equipment for tritium service; (4) to provide a final demonstration facility that could be directly copied for a D-T burning fusion machine; (5) to demonstrate long-term reliability of components; (6) to demonstrate long-term safe handling of tritium with no major releases or incidents; and (7) to investigate and evaluate the response of the fuel cycle and environmental packages to normal, off-normal, and emergency situations. (ERA citation 05:025066)

NIIEFA-A-0375 PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Elektrofizicheskoi Apparatury, Leningrad (USSR).
Effect of Geometry of Cooled Boundaries of Structural Elements of Electrophysical Devices under Cyclic Thermal Loading.
V. A. Divavin, M. A. Guseva, and E. D. Bolotova. 1978, 12p
In Russian.
U.S. Sales Only.

A non-stationary thermal field of a surface element with built-in cooling channels under one-side cyclic heat flow loading is considered. The cooling channels are in the form of tubes built in the thin-walled construction of a diameter considerably greater than the wall thickness. In one-dimensional approximation an analytical solution is obtained for boundary conditions of the third type (BC), as well as for modified BC when the cooling medium temperature is a linear function of time (sawtoothed). A comparison of the one-dimensional problem results with those of the numerical two-dimensional problem for an initial profile obtained by net methods is made for the vacuum chamber of the T-20 demonstration thermonuclear tokamak-reactor. An accumulative influence of the lower parts of cooling channels has been shown. The conclusion is made that the one-dimensional approximation in the calculation of the profile gives the acceptable results only for the cases when the mass surface of the developed cooling zones are small in comparison with the bulkhead body. Otherwise, and especially at high temperatures the necessity of transfer to the two-dimensional solution with provision for emission appears. (Atomindex citation 10:442978)

NRCN-460 PC **A03**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Source Driven Breeding Thermal Power Reactors. Part I. Using D-T Fusion Neutron Sources.
E. Greenspan, A. Schneider, A. Misulovin, D. Gilai, and P. Levin. Mar 78, 46p
U.S. Sales Only.

Improvements in the performance of fission power reactors made possible by designing them subcritical driven by D-T neutron sources are investigated. Light-water thermal systems are found to be most promising, neutronically and energetically, for the source driven mode of operation. The range of performance characteristics expected from breeding Light Water Hybrid Reactors (LWHR) is defined. Several promising types of LWHR blankets are identified. Options opened for the nuclear energy strategy by four types of the LWHRs are examined, and the potential contribution of these LWHRs to the nuclear energy economy are discussed. The power systems based on these LWHRs are found to enable a high utilization of the energy content of the uranium resources in all forms available - including depleted uranium and spent fuel from LWRs, while being free from the need for uranium enrichment and plutonium separation capabilities. (Atomindex citation 10:428134)

NRCN-461 PC **A03**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Source Driven Breeding Thermal Power Reactors. Part II. Using Lithium-Free Neutron Sources.
E. Greenspan. Mar 78, 43p

U.S. Sales Only.

The feasibility of fusion devices operating in the semi-catalyzed deuterium (SCD) mode and of high energy proton accelerators to provide the neutron sources for driving subcritical breeding light water power reactors is assessed. The assessment is done by studying the energy balance of the resulting source driven light water reactors (SDLWR) and comparing it with the energy balance of the reference light water hybrid reactors (LWHR) driven by a D-T neutron source (DT-LWHR). The conditions the non-DT neutron sources should satisfy in order to make the SDLWR viable power reactors are identified. It is found that in order for a SCD-LWHR to have the same overall efficiency as a DT-LWHR, the fusion energy gain of the SCD device should be at least one half that the DT device. The efficienct of ADLWRs using uranium targets is comparable with that of DT-LWHRs having a fusion energy gain of unity. Advantages and disadvantages of the DT-LWHR, SCD-LWHR and ADLWR are discussed. (Atomindex citation 10:428135)

NRL-MR-4212 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Properties of Ablatively Accelerated Targets.
B. H. Ripin, S. E. Bodner, and S. H. Gold. 16 May 80, 31p
Contract ES-77-A-01-6021

Targets are ablatively accelerated to high velocity (> 10 exp 7 cm/s) with good hydrodynamic efficiency (approx. 20%) using low-irradiance (10 exp 13 to 10 exp 14 W/cm exp 2) long (3 to 4 ns) Nd-laser pulses. Detailed properties of the interaction and acceleration as well as comments upon the suitability of this approach to the laser fusion application are presented. Results of unique double-target experiments are also included. (ERA citation 05:025074)

N80-28195/9 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Comparative Study of Energy Accounting for Heavy Ion Fusion with Various Driver Accelerators.
S. Kawasaki, and A. Miyahara. Apr 80, 18p IPPJ-454

Typical designs of driver heavy ion accelerator systems are compared with regard to their 'energy payback time' versus 'cost of construction'. The detailed analyses show that the energy investment for the construction of the Heavy Ion Fusion power station is somewhat smaller than the energy produced by the station in its lifetime, in spite of the large scale of its hardware. The situation could be more favorable than, or at least comparable with, the case of magnetically confined fusion.

N80-28196/7 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Surface Study of Fusion Research in Universities Linkage Organization.
A. Miyahara. Apr 80, 41p IPPJ-455
Presented at the Japan-US Joint Seminar Mater. Res. Effects in the Fusion Environ., Argonne, Ill., 7-10 Jan. 1980.

Progress in surface studies for the nuclear fusion research is reported emphasizing studies on the surface process and the surface damage. In the case of the surface process studies, recycling of hydrogen isotopes, desorption of gaseous light impurities, sputtering, blistering, arcing, and other surface processes are main concerns. On the other hand, for the surface damage studies, the problems are defined by the conceptual fusion reactor design study. These are classifications of the damage mechanism, the superposition of multiple damage effects, the study of modified surfaces produced by plasma irradiation and the surface erosion rate.

PPPL-1590 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Digital Computer Simulation Method for Complex Converter Systems.
C. Neumeyer, G. Karady, G. Bronner, and J. Murray. Oct 79, 10p
Contract EY-76-C-02-3073

This paper presents a new calculation approach along with typical results obtained from a computer program which implemented the method to simulate a 24 pulse rectifier/inverter system. The described program was found to have advantges over other methods in terms of the scope of the problem which may be simulated as well as the computational efficiency. The flexibility inherent in the computer model format permits the representation of basic variations of the ac and dc circuit configurations so that design alternatives may be studied without major code modification. (ERA citation 05:002309)

PPPL-1594 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Millimeter Radiometer Techniques for Plasma Temperature Diagnostics.
R. A. Bitzer. Nov 79, 26p
Contract EY-76-C-02-3073

Radiometers have been employed in radio telescopes to measure stellar plasma temperatures. However, when electron temperature measurements are made on hot dense plasmas in thermonuclear fusion research, radiometry techniques are modified. This report discusses these modifications as they are incorporated in radiometers on the PLT device. Included is a list of proposed radiometer developments and techniques for the PLT, PDX, and TFTR devices. (ERA citation 05:007849)

PPPL-1595 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Broadband Superheterodyne Tracing Circuits for Millimeter-Wave Measurements.
J. L. Doane. Nov 79, 18p
Contract EY-76-C-02-3073

Superheterodyne stimulus-response measurements can be made with high dynamic range, but are often sensitive to oscillator frequency drift and noise. The usual techniques for reducing this sensitivity often become impractical at millimeter-wavs frequencies and above. This paper describes a feed-forward tracing technique and its application to single frequency millimeter-wave interferometry and doppler-shift scattering measurements on tokamak plasmas. Swept frequency transmission measurements can also be made with high dynamic range using this technique. (ERA citation 05:007850)

PPPL-1610 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Plasma Heating R and D Assessment.
D. L. Jassby, K. H. Berkner, P. L. Colestock, R. L. Freeman, and H. H. Haselton. Nov 79, 40p
Contract EY-76-C-02-3073

The purpose of this report is to compare the heating requirements of INTOR with the present state-of-the-art of tokamak plasma heating technology and demonstrated heating performance, and also with the technology expected by 1983-84 according to development and testing programs in place. This comparison results in a set of recommendations for a heating technology development program for the 1980s. (ERA citation 05:005137)

PPPL-1662 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Current Generation by Unidirectional Lower Hybrid Waves in the ACT-1 Toroidal Device.
K. L. Wong, R. Horton, and M. Ono. May 80, 15p
Contract EY-76-C-02-3073

An unambiguious experimental observation of current generation by unidirectional lower hybrid waves in a toroidal plasma is reported. Up to 10 amperes of current was driven by 500 watts of rf power at 160 MHz. (ERA citation 05:025003)

PPPL-1664 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Low Energy Neutral Outflux from the PLT Tokamak.
D. E. Voss, and S. A. Cohen. May 80, 30p
CONF-800455-9
Contract EY-76-C-02-3073
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

A time-of-flight system has been developed to measure the energy spectrum of neutral deuterium atoms emitted from the PLT Tokamak plasma in the energy range 20 to 1000 eV. D exp 0 neutrals are mechanically chopped by a rotating 25 cm OD stainless steel disc with 24 .025 cm wide slots photo-etched at an 11.4 cm radius. The gated neutrals free stream 181 cm where they impinge on a Cu-Be disc, thereby ejecting secondary electrons which are collected and amplified by an electron multiplier. Since the energy dependence of the Cu-Be secondary emission coefficient as well as the multiplier gain are known from prior calibration, quantitative D exp 0 fluxes can be determined. (ERA citation 05:024994)

PPPL-1666 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Review of the Wall Problem and Conditioning Techniques for Tokamaks.
H. F. Dylla. May 80, 40p
Contract AC02-76CH03073

A variety of conditioning techniques have been applied to tokamaks to control low Z impurities originating from vacuum vessel surface contaminents and to modify the working gas recycling properties. After chemical or physical treatment of the vacuum vessel hardware, in-situ vacuum vessel treatments are usually applied, including: (1) vacuum baking; (2) discharge cleaning; and (3) gettering. As the magnetic fusion program moves to the next generation of large test reactors, the implementation of any of the above techniques becomes a costly procedure. It is therefore prudent to understand the mechanisms and physical-chemical effects of a particular conditioning procedure and maximize the efficiency. A review is given of the present understanding of the physical mechanisms, the resulting surface effects, and benefits to plasma performance of the various conditioning procedures. Particular attention is given to the application of hydrogen glow discharge cleaning and the use of titanium gettering as conditioning procedures. (ERA citation 05:025091)

SAND-79-0385 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Studies of Particle Beam Overlap and Electron Deposition in Thin Foils.
J. A. Halbleib, and T. P. Wright. Mar 79, 42p
Contract EY-76-C-04-0789

This report summarizes a somewhat diverse set of theoretical studies carried out in 1978 which were aimed at increasing our understanding of the physics of multiple-beam overlap and enhanced deposition in thin foils. The studies reported here involve electron and ion beam overlap in single and multiple cylindrical disks of channels, and single and multiple electron-beam deposition in thin foils. Some of the important consequences of these studies which affect ongoing research are the scaling formula derived for overlap current density gain in cylindrical geometry, an understanding of the importance of electron drift motion in thin-foil-enhanced deposition, and the necessity of providing non-axial return current paths and magnetic isolation of disks in multiple-disk configurations. (ERA citation 04:053966)

SAND-79-2338C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Probe Measurements of Impurities in the Plasma Boundary of PLT.
W. R. Wampler, S. T. Picraux, S. A. Cohen, H. F. Dylla, and S. M. Rossnagel. 1980, 22p CONF-800455-7
Contract EY-76-C-04-0789
International conference on plasma surface interactions in controlled fusion devices, Garmisch, F.R. Germany, 21 Apr 1980.

Carbon probes were exposed to the plasma edge in PLT at various distances from the plasma and to different numbers (1, 2, 3, 6, 12) of overlayed discharges. The type and areal density of impurities retained were determined using ion backscattering. The principal impurities with Z > 6 were found to be O, Fe, Cr, Ti, and Cu in decreasing order of abundance. Fluxes for these impurities at a position close to the wall were found to be respectively 14, 2.8, 0.8, 0.6 and 0.2 x 10 exp 15 /cm exp 2 (+- 25%) respectively, compared to the value 2.2 +- .5 x 10 exp 17 D/cm exp 2 s for the deuterium flux at this position. Lateral spreading of the impurity deposition profile behind the probe slit allowed a

lower limit to be placed on the impurity mean ion energy. Between the wall and radius of the ring limiter the impurity fluxes increased by a factor of approx. 2 compared to an increase in the D flux by a factor of approx. 5. Since impurity and deuterium fluxes were both measured the effect of sputtering by the incident deuterium on the impurity accumulation can be assessed. (ERA citation 05:025004)

SAND-79-6003 PC **A02**/MF **A01**
Akademiya Nauk SSSR, Moscow. Fizicheskii Inst.
Theoretical Investigations of Shell Target Compression and Burn.
Yu. V. Afanas'ev, N. G. Basov, and P. P. Voloservich. 26 Sep 79, 15p CONF-781256-2(Trans)
Contract EY-76-C-04-0789
C Russian Preprint No. 55, 1978.12. European conference on laser interaction with matter, Moscow, USSR, Dec 1978.

On the basis of experimental and theoretical results for thin shell targets, one may expect that: with an increase in laser energy, the absorption will increase and may attain a value of 80%; the effects of pre-heating will play a moderate role; as a result of all types of energy transformations (laser radiation, corona thermal energy, shell kinetic energy), the energy for heating the thermonuclear fuel may be approx.10% of the laser energy. (ERA citation 05:009544)

SAND-80-0402 PC **A10**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Intense Pulsed Ion Beams for Fusion Applications.
S. Humphries, Jr. Apr 80, 220p
Contract EY-76-C-04-0789

The subject of this review paper is the field of intense pulsed ion beam generation and the potential application of the beams to fusion research. Considerable progress has been made over the past six years. The ion injectors discussed utilize the introduction of electrons into vacuum acceleration gaps in conjunction with high voltage pulsed power technology to achieve high output current. Power levels from injectors exceeding 1000 MW/cm exp 2 have been obtained for pulse lengths on the order of 10 exp -7 sec. The first part of the paper treats the physics and technology of intense ion beams. The second part is devoted to applications of intense ion beams in fusion research. A number of potential uses in magnetic confinement systems have been proposed. (ERA citation 05:025075)

STUDSVIK-VD-79/1 PC **A04**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Work on Fusion Technology at Studsvik During 1978.
R. Pauli, R. Espefaelt, and J. Lorenzen. Feb 78, 61p
U.S. Sales Only.

Studsvik is associated with the EUR-ATOM fusion research program and work within fusion technology is carried out regarding reactor control, conceptual design, safety and environmental impact; radiation damage. In addition research by subcontracts is done in atomic physics data at Lund university and in surface physics at Research Institute of Physics, Stockholm university. (Atomindex citation 10:459967)

UCID-18078 PC **A21**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Interim Report on the Tandem Mirror Hybrid Design Study.
R. W. Moir. 1 Aug 79, 496p
Contract W-7405-ENG-48

The initial phase of a 2-year design study of a tandem mirror fusion reactor is presented. The following chapters are included: (1) mechanical design of the plant; (2) plasma physics; (3) blanket design; (4) magnet design; (5) injector design; (6) direct convertor design; (7) balance of plant design; (8) fission burner reactor; (9) environment and safety; and (10) economic analysis. (ERA citation 05:002266)

UCID-18209 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
MFTF TOTAL Benchmark.
J. H. Choy. Jun 79, 31p
Contract W-7405-ENG-48

A benchmark of the TOTAL data base management system as applied to the Mirror Fusion Test Facility (MFTF) data base was implemented and run in February and March of 1979. The benchmark was run on an Interdata 8/32 and involved the following tasks: (1) data base design, (2) data base generation, (3) data base load, and (4) develop and implement programs to simulate MFTF usage of the data base. (ERA citation 05:006344)

UCID-18274 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Small-Scale Experimental Tests of Tandem Mirror Machines with Thermal Barriers.
R. P. Drake. Sep 79, 33p
Contract W-7405-ENG-48

A summary is given of current physical understanding of tandem mirrors with thermal barriers. Physicists who understand tandem mirrors can use this document as a preliminary guide to the physical issues and experimental problems involved. This report will focus upon the issues that can be tested experimentally, and on the areas needing experimental and theoretical inventions. The next section discusses the plasma potentials and plasma confinement which correspond to a tandem mirror with thermal barriers, assuming the barriers exist in steady-state. The creation of a barrier is discussed, i.e., the natural tendency of the barrier cell to fill with plasma must be countered by pumping ions out of the barrier. The design of a barrier-pumping experiment for TMX is described. (ERA citation 05:002226)

UCID-18334 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Buildup Studies for MFTF-B.
J. M. Gilmore. 23 Apr 80, 54p
Contract W-7405-ENG-48

A one-dimensional radial transport code which was developed to study radial transport in tandem mirror machines has been used to perform buildup studies for the central-cell plasma of the proposed MFTF-B experiment. The effects of the cold, unpumped, neutral gas (which accompanies the hot, neutral-beam injection in the central cell) upon the central-cell plasma have been studied for the low-epsilon (epsilon identical with (omega /sub pi// omega /sub ci/)2) mode and for the two-component mode. A mode here is defined as a particular set of parameters (density, temperature, etc.) under which the experiment will be performed. A very preliminary study of the effects of plateau resonant transport upon the equilibrium plasma obtained for the low-epsilon mode of operation has also been performed. (ERA citation 05:024981)

UCID-18588 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Polarizer Reflectivity Variations.
R. G. Ozarski, and J. Prior. 22 Feb 80, 14p
Contract W-7405-ENG-48

On Shiva the beam energy along the chain is monitored using available reflections and/or transmission through beam steering, splitting, and polarizing optics without the intrusion of any additional glass for diagnostics. On the preamp table the diagnostic signal is obtained from the signal transmitted through turning mirrors. At the input of each chain the signal is obtained from the transmission through one of the mirrors used for the chain input alignment sensor (CHIP). At the chain output the transmission through the final turning mirror is used. These diagnostics have proved stable and reliable. However, one of the prime diagnostic locations is at the output of the beta rod. The energy at this location is measured by collecting small reflections from the last polarizer surface of the beta Pockels cell polarizer package. Unfortunately, calibration of this diagnostic has varied randomly, seldom remaining stable for a week or more. The cause of this fluctuation has been investigated for the past year and it has been discovered that polarizer reflectivity varies with humidity. This report will deal with the possible causes that were investigated, the evidence that humidity is causing the variation, and the associated mechanism. (ERA citation 05:025076)

UCID-18615 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Estimation of Neutral-Beam-Induced Field Reversal in MFTF by an Approximate Scaling Law.
J. W. Shearer. 28 Apr 80, 38p
Contract W-7405-ENG-48

Scaling rules are derived for field-reversed plasmas whose dimensions are common multiples of the ion gyroradius in the vacuum field. These rules are then applied to the tandem MFTF configuration, and it is shown that field reversal appears to be possible for neutral beam currents of the order of 150 amperes, provided that the electron temperature is at least 500 eV. (ERA citation 05:025051)

UCRL-Trans-11509 PC **A02**/MF **A01**
Akademiya Nauk SSSR, Moscow. Fizicheskii Inst.
Hydrodynamics of Spherical Targets with Allowance for Refraction of Laser Radiation.
V. B. Rozanov. Sep 79, 12p
Contract W-7405-ENG-48
C Preprint No. 78, Quantum Radiophysics, P.N. Lebedev Physics Institute, Moscow, 1979.

The present paper is devoted to the numerical simulation of laser experiments with spherical targets. To determine the energy absorbed, the equations of hydrodynamics with electron heat conduction and the Maxwell equations for laser radiation were solved using the density and temperature profiles obtained from hydrodynamic calculations. The flow is assumed spherically symmetric, and the laser beam is not necessarily focused at the center of the target. (ERA citation 05:005196)

UCRL-81673 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Heat Transfer in Inertial Confinement Fusion Reactor Systems.
J. Hovingh. 14 May 79, 18p CONF-790802-77
Contract W-7405-ENG-48
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

The transfer of energy produced by the interaction of the intense pulses of short-ranged fusion microexplosion products with materials is one of the most difficult problems in inertially-confined fusion (ICF) reactor design. The short time and deposition distance for the energy results in local peak power densities on the order of 10 exp 18 watts/m exp 3. High local power densities may cause change of state or spall in the reactor materials. This will limit the structure lifetimes for ICF reactors of economic physical sizes, increasing operating costs including structure replacement and radioactive waste management. Four basic first wall protection methods have evolved: a dry-wall, a wet-wall, a magnetically shielded wall, and a fluid wall. These approaches are distinguished by the way the reactor wall interfaces with fusion debris as well as the way the ambient cavity conditions modify the fusion energy forms and spectra at the first wall. Each of these approaches requires different heat transfer considerations. (ERA citation 05:003929)

UCRL-81919 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Space-Time Energy Concentration and the Design of DT Fusion Micro-Explosions.
H. L. Sahlin, and J. E. Brandenburg. Mar 80, 16p CONF-781247-8
Contract W-7405-ENG-48
International conference on energy storage, compression and switching, Venice, Italy, 5 Dec 1978.

As part of the effort to employ a plasma focus as a driver for fusion micro-explosions, many target concepts were explored and extensive imposion calculations have been carried out. Some of the basic principles of micro-explosion design are presented. (ERA citation 05:025077)

UCRL-82041 PC **A02**/MF **A01**
Exxon Research and Engineering Co., Linden, NJ.

Material Implications of Design and System Studies for Inertial Confinement Fusion Systems.
J. A. Maniscalco, and W. R. Meier. Dec 78, 11p CONF-790125-82
Contract W-7405-ENG-48
Topical meeting on fusion reactor materials, Miami Beach, FL, USA, 29 Jan 1979.

The major material requirements for inertial confinement fusion (ICF) reactors are presented. These requirements are defined and analyzed by first describing the environment created from the process of generating energy with ICF, and then analyzing the ICF reactor concepts which have been designed to cope with this hostile environment. (ERA citation 05:003930)

UCRL-82426(Rev.1) PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Physics of Inertial Confinement Pellets.
W. C. Mead. 9 Jul 79, 70p CONF-790393-1
Contract W-7405-ENG-48
American Physical Society meeting, Chicago, IL, USA, 19 Mar 1979.

An overview of inertial confinement fusion pellet physics is given. A discussion is presented of current estimated ICF driver requirements and a couple of pellet examples. The physics of driver/plasma coupling for two drivers which are being considered, namely a laser driver and a heavy ion accelerator driver, is described. Progress towards inertial confinement fusion that has been made using laser drivers in target experiments to date is discussed. (ERA citation 05:002326)

UCRL-82530 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Characterization Techniques for High Quality ICF Targets.
B. W. Weinstein, and C. D. Hendricks. 23 Mar 79, 11p CONF-790912-13
Contract W-7405-ENG-48
European conference on controlled fusion and plasma physics, Oxford, UK, 17 Sep 1979.

To avoid the effects of fluid instabilities, stringent requirements must be imposed on the surface quality and wall thickness uniformity of fuel pellets used in Inertial Confinement Fusion compression experiments. A systematic method was developed for specifying the type of defects which must be avoided and for evaluating measurement techniques for their suitability for detecting these defects. A review is given of the techniques currently available and those under development to show the relationship between these capabilities and the current and future requirements for pellet uniformity. The speed of these techniques and the implications for automated production of fuel pellets for a reactor are discussed. (ERA citation 05:023760)

UCRL-82768 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Fusion: The Power Source of the Future Inertial Confinement Option.
V. Rupert. 13 Jun 79, 19p CONF-790698-1
Contract W-7405-ENG-48
Society of Women Engineers national student conference, San Francisco, CA, USA, 27 Jun 1979.

Among the various energy options opened to man, fusion appears particularly attractive since fuel is plentiful, cheap, and universally available, the reaction is self quenching, produces in itself no radioactive wastes and radiation hazards are minimum. However, creating on earth conditions emulating the sun is not as easy task. Two significantly different approaches to obtaining the necessary conditions are being actively pursued and both have shown encouraging progress in the past few years. Magnetic confinement will be discussed in the next paper. Inertial confinement fusion is progressing towards scientific breakeven in the 1980's. High yield targets have been successfully imploded proving the feasibility of thermonuclear burn. High densities have recently been achieved using glass lasers as drivers. Power plants using fusion sources are being studied and could become operational in the early 2000's. (ERA citation 04:053878)

UCRL-82790 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Magnetic Mirror Confinement of High-Energy, High-Density Plasma.
F. H. Coensgen, and T. C. Simonen. 21 Aug 79, 18p
Contract W-7405-ENG-48

This paper summarizes results obtained from and work in progress on those experiments which have contributed significantly toward the confinement in single-cell magnetic mirror systems of plasmas close to thermonuclear conditions. Because the mirror confinement of such high-energy, high-density plasmas has been studied most extensively in the 2XIIB experiment, discussion of 2XIIB results forms a major portion of this paper. In these experiments, injection of low-energy plasma has been shown to suppress microinstabilities to sufficiently low levels that high-beta (beta approx. = 1) plasmas could be achieved and sustained by cross-field injection of beams of neutral particles. Plasma confinement was found to improve with ion energy, electron temperature, and plasma size. Based on these results, a larger Mirror Fusion Test Facility (MFTF) was designed to pursue confinement scaling to higher energies and larger plasma dimensions. MFTF design parameters and construction status are briefly reviewed. (ERA citation 05:003912)

UCRL-82791 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Tandem Mirror and Field-Reversed Mirror Experiments.
F. H. Coensgen, T. C. Simonen, and W. C. Turner. 21 Aug 79, 24p
Contract W-7405-ENG-48

This paper is largely devoted to tandem mirror and field-reversed mirror experiments at the Lawrence Livermore Laboratory (LLL), and briefly summarizes results of experiments in which field-reversal has been achieved. In the tandem experiment, high-energy, high-density plasmas (nearly identical to 2XIIB plasmas) are located at each end of a solenoid where plasma ions are electrostatically confined by the high positive poentials arising in the end plug plasma. End plug ions are magnetically confined, and electrons are electrostatically confined by the overall positive potential of the system. The field-reversed mirror reactor consists of several small field-reversed mirror plasmas linked together for economic reasons. In the LLL Beta II experiment, generation of a field-reversed plasma ring will be investigated using a high-energy plasma gun with a transverse radial magnetic field. This plasma will be further heated and sustained by injection of intense, high-energy neutral beams. (ERA citation 05:003913)

UCRL-82835(Rev.1) PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Progress of Laser Fusion at Lawrence Livermore Laboratory.
H. G. Ahlstrom. Jul 79, 63p CONF-790708-5(Rev.1)
Contract W-7405-ENG-48
XIV conference internationale sur les phenomenes d'ionisation dans les gaz, Grenoble, France, 9 Jul 1979.

The Shiva and Nova programs are briefly reviewed. Some target diagnostics are described. Some laser-plasma interaction experiments are discussed. (ERA citation 05:003931)

UCRL-82895 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Potential Design Modifications for the High Yield Lithium Injection Fusion Energy (HYLIFE) Reaction Chamber.
J. H. Pitts, J. Hovingh, W. R. Meier, M. J. Monsler, and E. G. Powell. 1 Nov 79, 16p CONF-791102-4
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Generation of electric power from inertial confinement fusion requires a reaction chamber. One promising type, the High Yield Lithium Injection Fusion Energy (HYLIFE) chamber, includes a falling array of liquid lithium jets. These jets act as: (1) a renewable first wall and blanket to shield metal components from x-ray and neutron exposure, (2) a tritium breeder to replace tritium burned during the fusion process, and (3) an absorber and transfer medium for fusion energy. Over 90% of the energy produced in the reaction chamber is absorbed in the lithium jet fall. Design aspects are included. (ERA citation 05:009536)

UCRL-82909 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Tandem Mirror Magnet System for MFTF.
R. H. Bulmer. 13 Nov 79, 6p CONF-791102-60
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The Lawrence Livermore Laboratory (LLL) is planning a major extension to the Mirror Fusion Test Facility (MFTF) now under construction at Livermore, CA. This extension brings MFTF to a full tandem mirror configuration, incorporating new ideas for improved plasma confinement. The tandem MFTF is tentatively called MFTF-B. As with most magnetic fusion devices, the confinement coils dominate the overall configuration. This paper concentrates on the MFTF-B magnet configuration, especially field shaping and structural considerations. (ERA citation 05:009520)

UCRL-82910 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Vent Rate of Superconducting Magnets During Quench in the Mirror Fusion Test Facility.
D. S. Slack. 1 Nov 79, 4p CONF-791102-29
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

When a superconducting magnet goes normal, resistive heating in the conductor evaporates surrounding LHe, which must be vented. The nature and speed at which the magnet goes normal and He is vented are not subject to rigorous analysis. This paper presents vent data from an existing magnet. An approximate mathematical model is derived and fitted to the data to permit scaling of vent requirements to larger size magnets. The worst case models of the vent employed in Mirror Fusion Test Facility (MFTF) cryogenic system design are also presented. (ERA citation 05:005176)

UCRL-82913 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Cryogenic Aspects of the Mirror Fusion Test Facility.
W. H. Sterbentz, and R. L. Nelson. 8 Nov 79, 5p CONF-791102-2
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

This paper covers the design and construction of the MFTF cryogenic system and a description of the operating procedures throughout the many functional modes. The coils and the cryopanels for maintaining the high vacuum environment weigh 417,000 kg (920,000 lb) and must be cooled from room temperature to 4.5 k. The cryogenic system for MFTF consists of a closed-loop helium system with a 3000-W helium refrigerator that uses gas-bearing expansion turbines and oil-flooded screw compressors. In addition, liquid helium storage facilities have adequate capacity for standby operation, and a complete helium-purification plant is capable of processing 17 m exp 3 /min (600 scfm). An open-loop liquid nitrogen system (with provision for later addition of a nitrogen recondenser) provides the required refrigeration for the radiation shields that must be maintained at 85 K. (ERA citation 05:003918)

UCRL-82914 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Design of the MFTF External Vacuum System.
P. M. Holl. 13 Nov 79, 11p CONF-791102-5

Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

As a result of major experiment success in the LLL mirror program on start-up and stabilization of plasmas in minimum-B magnetic geometry, a Mirror Fusion Test Facility (MFTF) is under construction. Completion is scheduled for September, 1981. MFTF will be used to bridge the gap between present day small mirror experiments and future fusion-reactor activity based on magnetic mirrors. The focal point of the Mirror Fusion Test Facility is the 35 foot diameter by 60 foot long vacuum vessel which encloses the superconducting magnets. High vacuum conditions in the vessel are required to establish and maintain a plasma, and to create and deliver energetic neutral atoms to heat the plasma at the central region. (ERA citation 05:003935)

UCRL-82919 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Alternatives for Contaminant Control During MFTF Plasma Buildup.
J. M. Khan, and L. E. Valby. 1 Nov 79, 5p CONF-791102-63
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The MFTF mirror device considers all low-energy species to be contaminants, since their primary effect is to erode the plasma boundary by charge-exchange reactions. Confinement for other than hydrogen isotypes is far from complete and confinement time is hardly more than transit time from the source to the end wall. The brevity of the confinement time makes it all the more necessary to prevent any contamination which might further reduce it. At Livermore, the historical solution to contaminant control has been to evaporate titanium onto cold surfaces. An alternative to this approach and its implications are considered. (ERA citation 05:009493)

UCRL-82920 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Designing MFTF Thermal Absorbers.
Y. Chang. 13 Nov 79, 4p CONF-791102-64
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Both ion dumps and neutral beam dumps have been designed for the Mirror Fusin Test Facility (MFTF) at the Lawrence Livermore Laboratory. Engineering and design has been completed, and fabrication will be contracted to industrial firms in late 1979. This paper presents the performance requirements, heat density, and heat distribution on both dumps. The thermal analysis for determining the dumps' size and methods for cooling them are discussed. Attention is also directed to mechanical design and fabrication as well as to leading-edge design thermal panels. (ERA citation 05:009532)

UCRL-82921 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Integrated Cooling System for the Mirror Fusion Test Facility.
B. Johnson, and Y. Chang. 1 Nov 79, 3p CONF-791102-65
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The MFTF components that require water cooling include the neutral beam dumps, ion dumps, plasma dumps, baffle plates, magnet liners, gas boxes, streaming guns, and the neutral beam injectors. A total heat load of nearly 500 MW for 0.5 s dissipates over 4-min intervals. A steady-flow, closed-loop system is utilized. The design of the cooling system assumes that all components require cooling simultaneously. The cooling system contains process instrumentation for loop control. Alarms and safety interlocks are incorporated for the safe operation of the system. (ERA citation 05:009525)

UCRL-82922 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Gettering High Energy Plasma in the End Loss Region of the Mirror Fusion Test Facility.
A. I. Goldner, and D. S. Margolies. 1 Nov 79, 5p CONF-791102-58
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The ions escaping from the end loss fan of the Mirror Fusion Test Facility (MFTF) neutralize when they hit the surface of the end dome. If the neutrals then bounce back into the oncoming plasma, they are likely to reionize, drawing power from the center of the plasma and reducing the overall electron temperature. In this paper we describe two methods for reducing the reionization rate and a computer code for estimating their effectiveness. (ERA citation 05:009488)

UCRL-82938 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Design of a Fiber Optic Multi-Tapped Computer Bus for a Pulsed Power Control System Application.
D. G. Gritton, L. W. Berkbigler, and J. A. Oicles. 11 Oct 79, 22p CONF-791102-57
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Control system techniques developed and proven on the Shiva laser have been extended to incorporate new electronic and electo-optic devices as well as conform to unique operational requirements of the 300 terawatt Nova laser system. This paper describes one segment of the control system being designed for the Nova laser currently under design/construction at Lawrence Livermore Laboratory. The specific segment covered is the control system bus structure responsible for power conditioning and real-time control functions. (ERA citation 05:009537)

UCRL-82972 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Manufacturing of Neutral Beam Sources at Lawrence Livermore Laboratory.
E. D. Baird, T. J. Duffy, G. A. Harter, E. D. Holland, and W. A. Kloos. 20 Nov 79, 7p CONF-791102-62
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Over 50 neutral beam sources (NBS) of the joint Lawrence Berkeley Laboratory (LBL)/Lawrence Livermore Laboratory (LLL) design have been manufactured, since 1973, in the LLL Neutral Beam Source Facility. These sources have been used to provide start-up and sustaining neutral beams for LLL mirror fusion experiments, including 2XIIB, TMX, and Beta II. Experimental prototype 20-kV and 80-kV NBS have also been designed, built, and tested for the Mirror Fusion Test Facility (MFTF). (ERA citation 05:009533)

UCRL-82974 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Engineering Design of a 40 kV Neutral-Beam Source.
T. J. Duffy, A. W. Molvik, E. D. Baird, D. L. Correll, and R. H. Munger. 5 Nov 79, 5p CONF-791102-10
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Sections of the 40-kV, 40-A, TMX source are shown. This module is comprised of the arc chamber and accelerator sections. The source accelerator section uses a single rectangular insulator to perform three functions: providing voltage standoff, forming the supporting structure, and acting as the vacuum wall. Both machinable glass ceramic (Corning Macor/sup TM/) and F.R.P. (Nema G-10) have been used for this insulater. In either case, the insulator is joined to the titanium base plate and extractor electrode by thermal-setting-epoxy adhesive. The parts are self jigging; the bonding is done at 120 to 130 exp 0 C under a load of .34 MPa. (ERA citation 05:005188)

UCRL-82975 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
HIBP Primary Beam Detector.
T. W. Schmidt. 1979, 4p CONF-791102-59
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A position measuring detector was fabricated for the Heavy Ion Beam Probe. The 11 cm by 50 cm detector was a combination of 15 detector wires in one direction and 63 copper bars - .635 cm by 10 cm to measure along an orthogonal axis by means of a current divider circuit. High transmission tungsten meshes provide entrance windows and suppress secondary electrons. The detector dimensions were chosen to resolve the beam position to within one beam diameter. (ERA citation 05:009490)

UCRL-83016 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Example of Predictive Rather Than Responsive Safety Research for Fusion Energy Experiments.
N. J. Alvares, and H. K. Hasegawa. 1979, 7p CONF-791102-67
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A fault tree analysis (FTA) was used to study the fire-management systems of two LLL fusion experiments (2XIIB and SHIVA). This technique identified failure modes of existing system components and indicated what the effects of component failure might be in the event of fire in the protected spaces. This paper describes the results of the initial analytical phase of the project and indicates critical unknown parameters required for further analysis. Moreover, the analytical procedures developed are applicable to most, if not all, safety disciplines and could serve as a basis for the logical reestablishment of the FL/SCC by DOE. (ERA citation 05:009534)

UCRL-83017 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Radiological Safety Design Considerations for Fusion Research Experiments.
K. W. Crase, and M. S. Singh. 1979, 5p CONF-791102-68
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A wide variety of fusion research experiments are in the planning or construction stages. Two such experiments, the Nova Laser Fusion Facility and the Mirror Fusion Test Facility (MFTF), are currently under construction at Lawrence Livermore Laboratory. Although the plasma chamber vault for MFTF and the Nova target room will have thick concrete walls and roofs, the radiation safety problems are made complex by the numerous requirements for shield wall penetrations. This paper addresses radiation safety considerations for the MFTF and Nova experiments, and the need for integrated safety considerations and safety technology development during the planning stages of fusion experiments. (ERA citation 05:009535)

UCRL-83312 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Recent Progress in Inertial Confinement Fusion at the Lawrence Livermore Laboratory.
H. G. Ahlstrom, and K. R. Manes. 15 Oct 79, 25p CONF-791047-3
Contract W-7405-ENG-48
11. annual electro optics/laser conference and exposition, Anaheim, CA, USA, 23 Oct 1979.

The Shiva and Argus laser systems at Livermore have been developed to study the physics of inertial confinement fusion. Both laser system designs are predicated on the use of large aperture Nd-glass disk amplifiers and high power spatial filters.

During the past year we have irradiated DT filled microshell targets with and without polymer coatings. Recently new instruments have been developed to investigate implosion dynamics and to determine the maximum fuel density achieved by these imploded fusion pellets. A series of target irradiations with thin wall microshells at 15 to 20 TW, exploding pusher designs, resulted in a maximum neutron yield of 3 x 10 exp 10 . Polymer coated microshells designed for high compression were subjected to 4 kJ for 0.2 ns and reached fuel densities of 2.0 to 3.0 gm/cm exp 3 . Results of these and other recent experiments will be reviewed. (ERA citation 05:009541)

UCRL-83342 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Consequences of Intensity Constraints on Inertial Confinement Fusion.
R. E. Kidder. 13 Sep 79, 18p CONF-791109-1
Contract W-7405-ENG-48
Workshop on laser interaction, Rochester, NY, USA, 5 Nov 1979.

It is shown that the conflicting requirements of high implosion efficiency (low corona temperature) and adequate energy transport (high corona temperature) can, together with other effects, limit useful infrared light intensities to values on the order of 100 Tw/cm exp 2 . Increased interest in ultraviolet lasers, for which this intensity constraint is expected to be less severe, and the entry of charged-particle drivers in the inertial confinement fusion (ICF) competition are consequences of this limitation. Analytical results based on a simple model are presented which show how the gain of an ICF target is modified by the existence of an arbitrary intensity constraint. (ERA citation 05:003932)

UCRL-83494 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Simulation of Superthermal Transport for Laser Fusion.
D. S. Kershaw. 19 Oct 79, 20p CONF-791135-1
Contract W-7405-ENG-48
21. annual meeting of the American Physical Society, Boston, MA, USA, 12 Nov 1979.

The relativistic multigroup diffusion equations describing superthermal electron transport in laser fusion plasmas were derived in an earlier UCRL. A successful numerical scheme based on these equations which is now being used to model laser fusion experiments is described. (ERA citation 05:007955)

UCRL-83527 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Optical Testing on the Nova Laser Fusion Program.
N. L. Thomas. 30 Oct 79, 15p CONF-791121-3
Contract W-7405-ENG-48
Workshop on optical fabrication and testing, Tucson, AZ, USA, 5 Nov 1979.

The optical testing part of the program requires characterizing index homogeneity of large blanks of fluorophosphate glass, optical surface figure and quality of large polished optics and performance of optical coatings such as antireflection, high reflectors and polarizing beam-splitters. For this purpose, a large effort is being expended to upgrade the optical test facilities at Lawrence Livermore Laboratory in preparation for the NOVA optics procurement. (ERA citation 05:009542)

UCRL-83570 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Design of a High Speed Rotating Mechanical Shutter.
I. F. Stowers, B. T. Merritt, and C. B. McFann. 6 Nov 79, 19p CONF-791102-7
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A high-speed rotating shutter was designed to operate in a 10 exp -6 Torr vacuum at the optical focus of a laser spatial filter. The shutter is basically a wheel, with a single 3 x 10-mm slot at the perimeter, which rotates with a peripheral speed of 1 km/s. The motor to drive the rotating wheel is magnetically suspended and synchronously wound. The wheel achieves a 4 mu s opening time and a timing accuracy of better than 0.2 mu s. (ERA citation 05:009543)

UCRL-84018 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Tandem Mirror Fusion Fission Hybrid Studies.
J. D Lee. 15 Feb 80, 8p CONF-800446-2
Contract W-7405-ENG-48
International conference on emerging nuclear energy systems, Lausanne, Switzerland, 8 Apr 1980.

Initial Tandem Mirror Hybrid Study predicts the ability to produce large amounts of fissile fuel (2 to 7 tonnes per year U233 from a 4000 MW plant) at a cost that adds less than 25% to the cost of power from an LWR. (ERA citation 05:025064)

UWFPP-7 PC **A04**/MF **A01**
Washington Univ., Seattle.
Evaluation of Impact Fusion Concepts. Final Report, 1 June 1979-1 December 1979.
F. L. Ribe, and A. T. Peaslee, Jr. 30 Jan 80, 64p
Contract EY-76-S-06-2225-046

This final joint report of the University of Washington and Los Alamos Scientific Laboratory programs on the evaluation of impact fusion concepts summarizes the conclusions and recommendations based on a critical review of the Impact Fusion Workshop held at the National Security and Resources Study Center at Los Alamos, New Mexico, on July 10-13, 1979, by joint UW/LASL working groups and on independent research conducted at the University of Washington. (ERA citation 05:025078)

18B. Isotopes

GRS-S-27 PC **A03**/MF **A01**
Gesellschaft fuer Reaktorsicherheit m.b.H., Cologne (Germany, F.R.).
Plutonium.
K. Mueller-Christiansen, and M. Wollesen. Apr 79, 46p
In German.
U.S. Sales Only.

As emotions and fear of plutonium are neither useful for the non-professionals nor for the political decision makers and the advantages and disadvantages of plutonium can only put against each other under difficulties, the paper wants to present the most essential scientific data of plutonium in a generally understandable way. Each of the individual sections is concluded and they try to give an answer to the most discussed questions. In order to make understanding easier, the scientific facts are only brought at points where it cannot be done without for the correctness of the presentation. Many details were left out knowingly. On the other hand, important details are dealt with several times if it seems necessary for making the presentation correct. The graphical presentations and the figures in many cases contain more than said in the text. They give the interested reader hints to scientific-technical coherences. The total material is to enable the reader to form his own opinion on plutonium problems which are being discussed in public. (Atomindex citation 10:476702)

INIS-mf-4294 PC **A02**/MF **A01**
Technische Hochschule, Darmstadt (Germany, F.R.). Fachbereich Anorganische Chemie und Kernchemie.
Separation of and from Decay Products of exp 228 Th or exp 224 Ra in the Form of Gaseous Alkyl Compounds. Excerpt.
Diss. (D.Eng.),
W. Trautmann. 1975, 4p
In German.
U.S. Sales Only.

Ra 224 or its precursor in the natural decay series Th 228 were used as sources to produce Po 216, Pb 212, Bi 212 and Tl 208. The decay products were converted to ethyl compounds using ethyl radicals which were transported in a flow of argon carrier gas (about 1 torr, rate 5 m/sec.) over a passage of about 1 m into a heating trap where as a result of the thermal decomposition of the metal alkyls, the metals condensed and could be gamma or alpha-spectrometrically measured (Po 216). It was attempted in further experiments to separate the decay products of Th 238 transported with the gas flow and to selectively separate them off in front of the detector. By changing the trap temperature, it was found that at low trap temperatures, thallium was enriched as compared to bismuth, or lead enriched compared to bismuth and thallium. At high temperatures, bismuth as well as thallium were enriched as compared to lead. A selective separation of Bi 212 from Pb 212 and Th 208 could be done by fast reaction of the transported ethyl compounds with chlorine as reactive gas whereby the yield of Bi 212 separated from the source was about 0.2%. (Atomindex citation 09:385731)

INIS-mf-5320 PC **A04**/MF **A01**
Ustav pro Vyzkum, Vyrobu a Vyuziti Radioisotopu, Prague (Czechoslovakia).
Radionuclide Applications in National Economy.
60p CONF-7905149-(Absts.)
National conference on radionuclide applications in national economy, Valtice na Morave, Czechoslovakia, 21 May 1979.
U.S. Sales Only.

Separate abstracts have been prepared for items within the scope of the energy data base. (Atomindex citation 11:496270)

Juel-1524 PC **A03**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemie.
Exp 18 O/ exp 16 O Ratio of Precipitation at the Site of Juelich Nuclear Research Centre, 1974 Through Mid-1978.
H. Foerstel, and H. Huetzen. Jul 78, 26p
In German.
U.S. Sales Only.

Since 1974 until June 1978 we collected samples of precipitation at the site of the Nuclear Research Center Juelich. Single precipitations, which we took during 1974, show a large variation of the exp 18 O/ exp 16 O ratio even within one day. The variation diminishes, if one compares the exp 18 O/ exp 16 O ratios of precipitation which was collected and pooled during each month. At our location we can see a minimum of the oxygen isotope ratio at March. The average of the exp 18 O/ exp 16 O ratio in the precipitation weighted by the amount of precipitation since 1974 until 1977 is -7.42 promille (related to Vienna-SMOW). The large scattering of the oxygen isotope ratio between single precipitations must be taken into account, if one works under field conditions. The results are the basic data, which help to describe the water turnover of our local ecosystem and the isotope fractionation of the biogeochemical oxygen cycle. (Atomindex citation 10:429954)

KFK-2651 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernverfahrenstechnik.
Development and Testing of Computer Aided Start-Up Procedures for U-235 Enrichment Separation Nozzle Cascades.
Diploma thesis,
H. Hein, R. Schuette, and H. Steinhaus. Sep 78, 29p
In German.
U.S. Sales Only.

In industrial scale separation nozzle cascades measured data acquisition and process control will be performed by on-line computer systems. To develop the necessary measurement and monitoring techniques, on-line control of the ten stage pilot plant by the WANG 2200 miniature computer system was tested. On-line data processing at the same time has reduced the number of measurements because a large number of operating data which cannot be measured directly can be obtained from a reduced number of measurements by calculation from the material balances in the gas dynamics network of the enrichment cascade.

This is performed on-line by means of a cascade monitoring code which produces diagrams of the deviations of major operating parameters from their set values and thus offers to cascade operators an improved picture of the present status of a cascade, thereby facilitating the detection of causes of defects. The graphic representation chosen for this purpose and the performance of the system in practical operation is explained by an example of cascade adjustment and by a few selected examples of cascade fault conditions. Calculation of the quantities derived at all stages from the pressure and concentration readings requires that the individual flow characteristics of the separation nozzles are known. Alos the compressor characteristics have to be determined. Since the monitoring computer in calculating the cascade status utilizes these component characteristics in current enrichment operation, routinely establishing and plotting these two characteristics is also attributed to the computer system (start-up procedures). (orig.) 891 HP. (Atomindex citation 10:430422)

NUREG/CR-0742 PC **A09**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Review and Integration of Existing Literature Concerning Potential Social Impacts of Transportation of Radioactive Materials in Urban Areas.
Chad Gordon, Claudia Anderson, Thomas F. Gessell, and Howard Prichard. Jul 80, 180p
SAND-78-7017
Prepared in cooperation with Texas Univ. at Houston. School of Public Health., and Rice Univ., Houston, TX.

The symbolic interactionist/collective behavior approach within sociology is applied to the transport of radioactive materials through urban environs, indicating that social impacts of such transport would extend far beyond objectively measurable radiological impacts of normal (incident free) transport, accidents during transport (with or without radiation release) or diversion by terrorists. This approach is used to delineate the major cultural frames of reference that interested publics and special groups might use in interpreting events surrounding radioactive material transport, and to specify probable social impacts of seven scenarios. These impacts include: (1) uncertainty, fear and mistrust, (2) processes, (3) initial agency responses, (4) subsequent collective behavior responses, and (5) a wide range of more general impacts on U.S. culture and special structure.

ZfK-381 PC **A03**/MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German D.R.).
6. Meeting of European Radioisotope Producers. Abstracts.
Jan 79, 26p CONF-790154-(Absts)
Meeting of European radioisotope producers, Rossendorf, German Democratic Republic, 25 Jan 1979.
U.S. Sales Only.

This paper contains the abstracts of the meeting lectures. Most of them are reviews on the current state and tendencies of isotope production in different countries, only some few concern production processes and quality control. (Atomindex citation 10:452445)

18C. Nuclear Explosions

AD-A086 840/6 PC **A04**/MF **A01**
Teledyne Geotech Alexandria VA Seismic Data Analysis Center
Intersite Magnitude-Yield Bias Exemplified by the Underground Nuclear Explosions MILROW, BOXCAR and HANDLEY.
Technical rept.,
D. H. von Seggern. 5 May 78, 67p Rept no. SDAC-TR-77-4
Contract F08606-77-C-0014, DARPA Order-2551

Estimates of surface-wave and body-wave magnitude were made from all available teleseismic WWSSN recordings of the Nevada Test Site shots BOXCAR and the Amchitka Test Site shot MILROW, in the megaton range of yield. These shots had very closely matched medium properties at the shot point. Tectonic strain release is not a significant factor in the amplitudes of either set of waves for these two shots. When averaged over common networks, and corrected for slight yield difference, the BOXCAR m sub 6 is approximately 0.3 less than that of MILROW while the BOXCAR M sub s is approximately 0.5 larger than that of MILROW. Analysis of the respective shot media does not account for these differences. For m sub b the major portion of the difference is probably due to greater attenuation under the NTS, as evidenced by comparison of MILROW and BOXCAR waveshapes and spectra. No adequate explanation can be found for the large M sub s difference. Another megaton shot at NTS, HANDLEY, was also analyzed to provide control. While the HANDLEY m sub b is approximately equal to that of MILROW the shot point medium was substantially different and if account is made of the response of the shot point medium to a dilatant force according to the theory of Hudson and Douglas (1975), then the m sub b difference between HANDLEY and BOXCAR may be accounted for theoretically.

UCID-18300(Pt.1) PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
LLL K Division Nuclear Test Effects and Geologic Data Base: Glossary and Parameter Definitions (U).
N. W. Howard. 22 Nov 79, 72p
Contract W-7405-ENG-48

The report lists, defines, and updates Parameters in DBASE, an LLL test effects data bank in which data is stored from experiments performed at NTS and other test sites. Parameters are listed by subject and by number. Part 2 of this report presents the same information for parameters for which some of the data may be classified. (ERA citation 05:009042)

18D. Nuclear Instrumentation

AAEC/E-455 PC **A03**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Australian Commonwealth Standard of Measurement for Absorbed Radiation Dose.
D. F. Urquhart, E. P. Johnson, and W. S. Badger. Sep 78, 34p
U.S. Sales Only.

As an agent of the Commonwealth Scientific and Industrial Research Organization, the Australian Atomic Energy Commission is responsible for the maintenance of the Australian Commonwealth standard of absorbed dose. A graphite calorimeter was designed and built at the AAEC Research Establishment to provide such a standard for the dose absorbed in carbon from gamma and X-ray beams with maximum photon energies above 500 keV. The calorimeter measures the dose averaged over the volume of a thermally insulated absorber disc of diameter 20 mm, thickness 3 mm and mass 1.7 g. The absorber and associated adiabatic and temperature controlled jackets are contained within a small graphite phantom of diameter 15 cm. The depth to the centre of the absorber is adjustable between 2.1 and 10 cm. By using a modified vacuum chamber window, the minimum depth can be reduced to 5 mm for use with high energy electron beams. The calorimeter has been in operation for more than 12 months and no change in its response to a exp 60 Co source has been detected in that time. The precision of dose measurements is +- 0.3 per cent at a dose rate of 4.2 mGy s exp -1 (25 rad min exp -1). Graphite and water phantoms have been made to enable portable working standards of absorbed dose in carbon and water to be calibrated against the primary standard. (Atomindex citation 10:476756)

AD-A086 726/7 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Absolute Calibration of a Prompt Gamma Ray Detector for Intense Bursts of Protons.
Memorandum rept.,
F. C. Young, F. Oliphant, S. J. Stephanakis, and A. R. Knudson. 31 Mar 80, 33p NRL-MR-4171, AD-E000 457

A detector for determining the intensity and duration of kiloampere pulsed proton beams is described. Two different size detectors were calibrated absolutely using the continuous proton beam from a Van de Graaff accelerator. An absolute measurement of a kiloampere pulsed proton beam is described, and the measured current is in agreement with an independent determination of the total proton intensity by nuclear activation.

AERE-R-9190 PC **A03**/MF **A01**
UKAEA, Harwell. Atomic Energy Research Establishment.
Nuclear Accident Dosimetry Systems. UK Measurements at the Fourth I.A.E.A. Intercomparison at Harwell, April 1975.
P. D. Holt, and S. J. Boot. Sep 78, 26p
U.S. Sales Only.

An international Intercomparison of Nuclear Accident Dosimetry Systems was held at Harwell in April 1975 under the auspices of the IAEA. The source of radiation was the pulsed reactor VIPER at AWRE Aldermaston. This paper presents the results of the measurements made by the Harwell team which participated in the Intercomparison. For the neutron dose measurements standard nuclear accident dosimeters were exposed on a Bomab phantom and in free air. In the UK system of nuclear accident dosimetry the fast neutron dose is measured by sulphur activation together with, if possible, another detector with a lower threshold, namely either indium (sup(115m)In activation), body sodium (exp 24 Na activation) or neptunium. Fast neutron dose estimates were made by sulphur alone and by the other three methods. The results were consistent with those expected on the basis of previous work, except for the method involving body sodium. The results have been compared with those calculated from measurements before the Intercomparison with an ionization chamber system and neutron spectrometers. Some gamma-ray dose measurements were made with the TLD's in the standard criticality lockets, but, because of the large correction expected for (n, gamma) dose from the foils in the lockets, the principal gamma-ray measurements were made with experimental TLD's and with special film dosimeters containing no cadmium. These agreed satisfactorily with each other and with the ionization chamber measurements. (Atomindex citation 10:446044)

AERE-R-9374 PC **A06**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Code of Practice and Design Principles for Installed Radiological Protection Systems.
R. G. Powell. Dec 78, 101p ACRPI-(77)P5
U.S. Sales Only.

For some years there has been comprehensive guidance documentation for nuclear reactor instrumentation, but apparently no corresponding guide for designers and installers of radiological protection instrumentation. A small group of instrumentation engineers discussed this lack of a suitable guide, and they examined the main points on which it should be based. This document attempts to present a comprehensive and detailed review of those points. It is intended to give an overall coverage and serve as a reference document for specific points; it should also be of value to the newcomer to the radiological protection instrumentation field. This Code of Practice represents a standard of good practice and takes the form of recommendations only. Each installation must be assessed individually, and agreement on its suitability must be reached locally by the designers and the officers responsible for safety and operation. The document is arranged in sections, as follows: outline of RPI requirement, general conditions, operational characteristics, radiation environment, nonradiation environment, overall design, availability and reliability, information display, human factors, power supplies, manufacture and quality assurance, testing, cost, installation, maintainability, documentation, bibliography. (Atomindex citation 10:445298)

CEA-CONF-4181 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Services d'Electronique.

Progress on Health Physics Monitoring Systems at the French Atomic Energy Commission.
B. Grimont, H. Joffre, and P. Leblanc. 9 Sep 77, 24p CONF-7710210-1
In French.Workshop on the recent progress in the electronic equipment for radiation protection near nuclear facilities, Arcueil, France, 20 Oct 1977.
U.S. Sales Only.

The need for health physics protection on nuclear plants or laboratories (nuclear power plants, fuel processing plants, etc.) leads to data measurement and monitoring centralization. This paper reviews the systems used for that purpose: old monobloc electronic systems, minicomputer systems, recent microprocessor-based systems, it shows the impact of new methods on the system performances standardization of measurements and alarm levels for irradiation and contamination, reliability, peripheral device (typewriters, CRT) availability for easy and efficient monitoring, and hardware compactness. (Atomindex citation 10:446036)

CONF-790859-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Alpha Liquid Scintillation Counting: Past, Present, and Future.
W. J. McDowell. 1979, 19p
Contract W-7405-ENG-26
International conference on liquid scintillation counting--recent applications and development, San Francisco, CA, USA, 21 Aug 1979.

Beta liquid scintillation counting has been used for about 30 years, and its effectiveness for alpha particles has been known for almost that long; however, the technique has not been widely applied to alpha particle detection because of poor energy resolution, high background, and variable interference from beta and gamma radiation. Beginning with the work of Horrocks in the early 1960s, improvements in energy resolution and background rejection have been made. Further developments at Oak Ridge National Laboratory over the past 10 to 12 years have resulted in improved methods of sample preparation (using liquid-liquid extraction methods to isolate the sample and introduce it into the scintillator) and better instrumentation, including electronic rejection of beta and gamma pulses. Energy resolutions of 200- to 300-keV FWHM and background counts of 0.01 cpm are now routine. Alpha liquid scintillation spectrometry is now suitable for a wide range of applications, from the accurate quantitative determination of relatively large amounts of known nuclides in laboratory-generated samples to the detection and identification of very small, subpicocurie amounts of alpha emitters in environmental-type samples. Suitable nuclide separation procedures, sample preparation methods, and instrument configurations are outlined for a variety of analyses. (ERA citation 05:024560)

CONF-7910149-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Ceramic BeO Exoelectron Dosimeters for Tritium and Radon Monitoring.
R. B. Gammage. 1979, 11p
Contract W-7405-ENG-26
International symposium on exoelectron emission and dosimetry, Arhenshoop, German Democratic Republic, 8 Oct 1979.

An environmental monitoring device with BeO ceramic dosimeters can be used to measure exp 222 Rn in dwellings. Radon diffuses into a porous hemispheric chamber and the radon daughters are electrostatically collected on aluminized Mylar foil covering the BeO dosimeter that records the alpha activity. A 10:1 signal-to-background ratio results from a radon exposure of only pCi-h/l. This high sensitivity makes accurate radon measurement possible within one day, even at near background levels of a few tenths pCi/l. The BeO exoelectron dosimeter is also uniquely suited for monitoring occupational exposure to insoluble tritium gas. At one-fifth the maximum permissible concentration, exposure for 8 hours gives a 10:1 signal-to-background exoelectron response to the low energy beta rays. Compensation for any exoelectron response caused by photon radiation can be made by reading the thermoluminescence. The tritium exposure produces negligible thermoluminescence. Progress in these and other applications is now totally dependent on achieving reliability and long-term stability of the exoelectron dosimeter. (ERA citation 05:024561)

ECN-56 PC **A03**/MF **A01**
Stichting Energieonderzoek Centrum Nederland, Petten.
Consistency Between Integral and Differential Cross Section Data.
W. L. Zijp. Mar 79, 42p
U.S. Sales Only.

This report gives, with some editorial improvement, the contents of an invited paper, prepared for the IAEA Advisory Group Meeting on nuclear data for reactor dosimetry, held at Vienna, 13-17 November 1978. It describes the present status of the confrontation of measured cross section values averaged over a benchmark neutron spectrum, with the calculated values, derived from evaluated cross section data and the best available numerical benchmark spectrum data. Information is collected on three aspects of the comparison: the uncertainty in the average cross section values, the discrepancy between measured and calculated section values, and the consistency between measured and calculated values. Available numerical data are presented in a series of tables. The calculated average cross sections are mainly based on the ENDF/B-IV dosimetry file. It is planned to repeat and extend this study when new or more evaluated data become available. (Atomindex citation 10:470507)

EUR-6004 PC **A09**/MF **A01**
Commission of the European Communities, Luxembourg.
European Neutron Dosimetry Intercomparison Project (ENDIP). Results and Evaluation.
J. J. Broerse, G. Burger, and M. Coppola. 1978, 180p
U.S. Sales Only.

A total of twenty groups from nine countries participated in sessions of the European Neutron Dosimetry Intercomparison Project (ENDIP) which were held during 1975 at GSF, Munich-Neuherberg and TNO, Rijswijk. The data of all participants are collected, the analysis and evaluation of the results are given in the present report. Specific chapters deal with the experimental arrangements and monitoring results at GSF and TNO, characteristics of the dosimetry systems employed by the paticipating groups and the basic physical data and correction factors employed for the determination of kerma and absorbed dose. In general, the participants in ENDIP quote systematic uncertainties of 7 to 8% in the neutron and total kerma or absorbed dose, which are mainly attributed to inadequate knowledge of basic constants. The variations in the results obtained by different participants seem to be in accordance with the relative large systematic uncertainties quoted. In order to determine the influence of the use of different values for the physical parameters, the relative responses of the participants' dosimeters have also been compared. The variances of quoted kerma and dose values are of the same order of magnitude as those of instrument responses. This result indicates inconsistencies in experimental techniques employed by the participants for the determination of kerma and absorbed dose. A separate nonparametric analysis of the ENDIP results confirmed that there are considerable systematic differences. Recommendations for future studies on neutron dosimetry for biological and medical applications are given at the end of the report. (Atomindex citation 10:426653)

FRNC-TH-762 PC **A06**/MF **A01**
Paris-11 Univ., Orsay (France).
Study of the GOLIATH Vertex Spectrometer Having a Wide Solid Angle.
S. Zaninotti. 1977, 108p
In French.These (3e Cycle).
U.S. Sales Only.

In 1975, the Goliath magnet, fitted with proportional chambers, was chosen as vertex spectrometer for a high energy elastic scattering experiment. The best way to assess the performance of the spectrometer and to monitor the functioning of the chambers was to carry out a low energy elastic scattering experiment, the kinematic characteristics of the back scattered particle being virtually separate from the momentum of the incident particle. The analysis of these data enabled the resolution of the spectrometer into pulses to be verified. The excellent resolution was achieved by developing the research on the accurate determination of the magnetic field and the parametrication of the field components (by an original method well suited to the revolution symmetry to the magnet) as well as on the processing programs of the data emerging from the proportional chambers. The results obtained and analyzed in this work showed that the spectrometer possessed the qualities required to form the detection device of the complete high energy experiment; they agree with the Monte Carlo calculations that simulated the experiment. The present experiment which utilises Goliath in its equipment confirms the quality of the magnetic field parametrication: the standard deviation of the Gaussian adjusted on the spectrum of the PSI (identified by its decay into 2 U) is 50 MeV/c. The relative deviation on the experimental mass of the PSI is 0.5 per mille. (Atomindex citation 11:503114)

FRNC-TH-772 MF **A01**
Paris-11 Univ., Orsay (France).
Study of Large Drift Chambers with High Precision.
P. Perez. 1978, 84p
In French.These (3e Cycle).
U.S. Sales Only. Microfiche copies only.

Among the measuring instruments used in high energy physics for detecting particles, drift chambers are being universally employed on an increasing scale because of their outstanding properties. With this type of chamber it is possible to determine the position in space of a trace left by a charged particle to within a few hundred microns and with very easy coding and recording of the data. As part of an experiment carried out in the CERN (ISR) proton collision rings, a set of 24 large drift chambers was assembled. The great accuracy of these chambers enabled a reduction to be made in the distances over which the determinations would have been made with conventional chambers and thereby to benefit from a wide solid angle of detection without the apparatus reaching prohibitive dimensions. (Atomindex citation 11:503082)

FRNC-TH-773 PC **A07**/MF **A01**
Paris-11 Univ., Orsay (France).
Study of a Proportional Chamber for the Detection of Muons in the CELLO Experiment.
A. Durand. 1978, 127p
In French.These (3e Cycle).
U.S. Sales Only.

The physics of e exp + e exp - interactions that the CELLO experiment is proposing to do requires good mu detection. For this, the prototype of a wire type proportional chamber with integrated logical system read-out is under study. The various phenomena that govern the working of a wire type proportional chamber are recalled first of all. Section II deals with the various working and read-out modes. Section III is devoted to the description of the method chosen and its advantages. In Sections IV and V, the two more specifically studied read-out methods are presented and it is shown that the read-out method by delay line proves to be much more delicate to use than the integrated electronic method finally selected. (Atomindex citation 11:503026)

FRNC-TH-848 PC **A06**/MF **A01**
Aix-Marseille-1 Univ. (France).
Application of Duality to an Unstable Problem in Neutron Spectrometry and Dosimetry.
a. Fouque. 1978, 121p
In French.These (3e Cycle).
U.S. Sales Only.

A general account is given of unstable linear equations, showing the importance of the dually theory for convex optimization problems. The theoretical study is applied to the numerical solution of neutron spectrometry and dosimetry problems with a multidetector system. From the numerical viewpoint the data of the multisphere system, made up of polyethylene spheres and a helium 3 counter, are used exclusively. (Atomindex citation 11:505948)

FRNC-TH-850 PC **A05**/MF **A01**
Toulouse-3 Univ. (France).
Relative Efficiency of the Radiothermoluminescence Induced by exp 238 Pu alpha-Particles in LiF:Mg, Al sub 2 O sub 3 and CaSO sub 4 :Dy.
M. Vicy. 1978, 85p
In French.Thesis.
U.S. Sales Only.

This work represents a comparative study of the radiothermoluminescence (R.T.L.) induced by exp 60 Co gamma rays and exp 238 Pu alpha-particles in three R.T.L. materials: lithium fluoride, alumina and dysprosium activated calcium sulphate. The T.L. glow curves induced by the two radiations are very similar. However, for the same absorbed dose, different sensitivity is seen to each form of irradiation. Measurements of the relative R.T.L. efficiency, epsilon, were made in the linear zone (dose<1Gy). These response differences are attributed to the manner in which the energies of the two radiations are distributed in the detection material. Theoretical determination of epsilon can be carried out from calculation of the spatial distribution of the ionization energy density around the alpha -particle track. (Atomindex citation 10:492170)

IEA-DT-103 PC **A04**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Thermal Neutrons Thermoluminescence Dosimetry Using CaF exp 2 + KBr E CaSO sub 4 : Dy + Br.
Tese (M.Sc.),
A. M. P. Leite. Mar 79, 59p
In Portuguese.
U.S. Sales Only.

Cold-pressed samples of CaF sub 2 + KBr and CaSO sub 4 :Dy + KBr have been used in the thermal neutron detection by the thermoluminescence technique. The amount of 100 mg of the TL phosphor added to 80 mg of KBr showed to be the optimum mixture regarding sensitivity as well as the handling of the dosimeters. The detection is based on the self-irradiation of the phosphor by the Br isotopes activated by exposure to a neutron-gama field. The prompt dose and consequentely the gama contribution are erased by post-irradiation thermal annealing. A linear dependence has been found between the TL self-induced signal and the thermal neutron flux in the range 10 exp 6 n.cm exp -2 .seg exp -1 -10 exp -12 n.cm exp -2 .seg exp -1 . The minimum detectable fluence has benn determined as 10 exp 9 n.cm exp -2 and 10 exp 6 n.cm exp -2 using pellets of CaF sub 2 + KBr and CaSO sub 4 :Dy + KBr, respectively. The main results suggest the use of CaSO sub 4 :Dy + KBr pellets and TL as a complementary technique for thermal neutron detection. (Atomindex citation 11:497332)

INIS-mf-4100 PC **A03**/MF **A01**
Universidade Federal do Rio de Janeiro (Brazil). Coordenacao dos Programmas de Posgraduacao de Engenharia.
Mounting and Testing of a 'Sandwich' Type Neutron Spectrometer with Semiconductor Detectors and exp 6 Li.
M. A. Fabro, and A. G. da Silva. 1973, 36p
In Portuguese.
U.S. Sales Only.

Commercial surface barrier detectors (Si(Au)) were used to construct the spectrometer; the exp 6 LiF was evaporated by vacuum onto a film of Formvar and afterwards over the surface of one of the detectors, with a exp 6 LiF thickness of 0,2 mu m (50 mu g/cm exp 2) and 1,5 mu m(400 mu g/cm exp 2) respectively. Tests were made with slow neutrons and with neutrons from the reactions D(d,n) exp 3 He (2,65 MeV) and T(d,n) exp 4 He (14 MeV). The energy resolution for thermal neutrons was about 200 keV (FWHM) for the sum (E sub(t) + E sub(alpha)) and about 7 keV (FWHM) for the difference (E sub(t) - E sub(alpha)) with an evaluated efficiency of 5,5x10 exp -4 , for the sum. For the 2,65 MeV neutrons, the energy resolution was about 240 keV (FWHM) and an evaluated efficiency of 2,1 x 10 exp -7 . It was not possible to detect 14 MeV neutrons. (Atomindex citation 09:366019)

INIS-mf-4305 MF **A01**
Universidade Federal do Rio de Janeiro (Brazil). Coordenacao dos Programas de Pos-graduacao de Engenharia.
Statistical Chopper in the Time-of-Flight Technique.
J. de Albuquerque Vieira. Dec 75, 191p
In Portuguese.Thesis.
U.S. Sales Only. Microfiche copies only.

A detailed study of the 'statistical' chopper and of the method of analysis of the data obtained by this technique is made. The study includes the basic ideas behind correlation methods applied in time-of-flight techniques; comparisons with the conventional chopper made by an analysis of statistical errors; the development of a FORTRAN computer programme to analyse experimental results; the presentation of the related fields of work to demonstrate the potential of this method and suggestions for future study together with the criteria for a time-of-flight experiment using the method being studied. (Atomindex citation 09:385207)

INIS-mf-4320 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
CAMAC High Energy Physics Electronics Hardware.
I. F. Kolpakov. 1977, 8p CONF-7708107-
International summer school on occupational physics, Liblice, Czechoslovakia, 20 Aug 1977.
U.S. Sales Only.

CAMAC hardware for high energy physics large spectrometers and control systems is reviewed as is the development of CAMAC modules at the High Energy Laboratory, JINR (Dubna). The total number of crates used at the Laboratory is 179. The number of CAMAC modules of 120 different types exceeds 1700. The principles of organization and the structure of developed CAMAC systems are described. (Atomindex citation 09:399109)

INIS-mf-4637 PC **A05**/MF **A01**
Ceskoslovenska Akademie Ved, Prague. Laborator Radiologicke Dozimetrie.
Whole-Body Counter in Internal Contamination Measurement of A-1 Nuclear Power Plant Personnel.
D. Ondris, M. Herchl, L. Bakos, M. Homola, and K. Barta. Jun 76, 82p CONF-7611117-(Sum)
In Slovak.National symposium on ionizing radiation dosimetry, Marianake Lazne, Czechoslovakia, 8 Nov 1976.
U.S. Sales Only.

No abstract available.

INIS-mf-4717 PC **A16**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow.
Delayed Detectors for Neutron Flux Measurement in Fusion Experiments.
V. A. Burtsev, A. I. Vdovin, V. D. Dyatlov, V. A. Kuz'min, and V. I. Kutsonits. 1977, 351p CONF-770483-P4
In Russian.All-union conference on neutron physics, Kiev, USSR, 18 Apr 1977.
U.S. Sales Only.

Following dependences are investigated: pulse front duration on the commutation current; pulse duration on the length of a formation line and its duration limit at a slight reduction of a voltage on a load; load pulse amplitude on the wave resistance and on the line length. The circuit of thyratron and neutron tube test is presented. The expression for the pulse front duration and its constituent quantities are obtained. The graphical dependence of the front duration on the commutation current is given for seven different thyratrons and for NT-8 neutron tubes. Graphs of variation in the front duration are given for neutron tubes. Dependences of relative pulse durations on those obtained by calculation are shown for different wave resistances and different thyratrons, and also for NT-8 neutron tubes. Dependences of load pulse amplitudes on the length of the formation line and on the calculated pulse duration, and also dependences of amplitude on the wave resistance of the line at different line lengths for different thyratrons and neutron tubes are presented. (Atomindex citation 10:430995)

INIS-mf-5094 PC **A02**/MF **A01**
Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia).
Study of Neutron Field in Mockup of Sodium Pipe - Experiments and Calculations. Part 1.
J. Burian, M. Marek, and B. Osmera. 1977, 20p
In Russian.
U.S. Sales Only.

The spatial and spectral neutron distributions in a sodium pipe mockup were experimentally studied in the WWR-S reactor channel within the energy range from thermal to 10 MeV. The types of measurement, piping configuration and the detectors employed are described used for the individual stages of testing. The sodium pipe mockup consisted of six cylindrical blocks of 40 cm in both diameter and length, of three blocks imitating the pipe bend and of one block connected to the bend. The block walls were made of aluminium of 4 to 6 mm thickness. (Atomindex citation 10:477102)

INIS-mf-5095 PC **A02**/MF **A01**
Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia).
Personnel Dosimetry at Nuclear Research Institutes Abroad.
V. Burjan. Dec 76, 6p
In Czech.
U.S. Sales Only.

Personnel dosimetry is surveyed as operated in selected institutes involved in nuclear research. Staff training for personnel dosimetry in Austria, Italy and Holland is briefly characterized. The organization of personnel dosimetry in some institutes is discussed with respect to the dosemeters used, their evaluation and average personnel doses. The properties are briefly compared of different thermoluminescence materials and of luminescence, film and glass dosemeters. The costs of thermoluminescence and photographic film dosimetry are compared on an example from the Lawrence Livermore Laboratory, USA. (Atomindex citation 10:476738)

JAERI-M-8069 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
High-Purity Germanium Diodes with "Buffer Ring".
M. Ishii, M. Ohshima, T. Matsuzaki, and H. Taketani. Feb 79, 21p
In Japanese.
U.S. Sales Only.

A special geometric structure "buffer ring" has greatly increased the breakdown voltage of high-purity germanium diodes. A procedure of fabricating the diodes with the buffer ring is described in detail. For the purpose of constructing gamma-ray spectrometers with these diodes, a convenient vacuum pump combined with the cryostat has been developed. (Atomindex citation 11:497325)

JINR-R-10-12096 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Program Package for Checking the Measurement Results of Chamber Photographs.
S. G. Badalyan, N. N. Govorun, V. G. Ivanov, and T. A. Strizh. 1978, 24p
In Russian.
U.S. Sales Only.

To provide an analysis of reasons due to which the geometry reconstruction programs reject the stereoviews measurements, received from JINR heavy liquid bubble chambers and measured by means of semi-automatic devices, HPD or spiral reader, a special program package is created. Descriptions of the method are given for checking the results of chamber photographs measurements, purposes and characteristics of package programs, technique of their generation in batch job mode and tests results on real events. The method suggested allows to obtain the precision characteristics for event element measurement and good measured event number estimation without their full geometry reconstruction. The last is one of the most important characteristics of the filmmeasuring devices. The use of the package programs for the analysis of event rejection reasons significantly reduced the work expenses for the revealing of these reasons. The informative-reference and generation systems of the program package allowed the different users, including physicists and engineers, to make such analysis for many private purposes. (Atomindex citation 11:497525)

JINR-R-13-11869 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Performance of Gas Proportional Counters at High Pressures.
V. Kh. Dodokhov, V. A. Zhukov, A. V. Lazarev, A. A. Nozdrin, and V. A. Stolupin. 1978, 10p
In Russian.
U.S. Sales Only.

The performances of gas proportional counters intended to some isotopes absolute activity measurements are investigated at a gas pressure ranging from 5 to 100 atm. The counter working agent (filling gas) is pure Ar and the CH sub 4 /Ar,Xe/ Ar,CH sub 4 /Xe/Ar gas mixtures. The counter has cathode diameters 6,10,14 mm and anode diameters are 10,16,20 mu m. It is found that an addition of 0.5% Xe to Ar results in a considerable decrease (approximately by a factor of 2) of working voltage applied to counters, compared to pure Ar filling, just as maximum gas amplification factor is increased. The counter energy resolution is 5.5-7% (FWHM) for exp 241 Am gamma -quanta with the 59.57 keV energy at Ar+0.5% Xe mixture pressure ranging from 8 to 100 atm. It is shown that it is more efficiently to use argon with addition of xenon, but no methan for stabilization of the gas counters performance at high pressures. (Atomindex citation 10:470857)

JINR-R-13-11933 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Charge Losses in Semiconductor Detectors in the Process of Heavy-Ionizing Particle Detection.
V. F. Kushniruk. 1978, 18p CONF-7810206-1
In Russian.Conference on semiconductor detectors of nuclear radiation, Kiev, USSR, 23 Oct 1978.
U.S. Sales Only.

In order to investigate charge losses in the detection of heavily-ionizing particles various approaches to describing charge losses are analyzed. It is shown that earlier developed models of charge losses based on the electron flow to detector surface, decreasing carrier mobility in the inversion layer and on the recombination through levels of the traps do not satisfy to experimental results. The proposed formula for a number of charges lost in the collection process may be written as: delta N=KZsup(2/3)N/RxTsub(pl), where K is the proportionaly coefficient, Z is the atomic number of heavy ion, N is the full number of charges generated, R is the ion range, Tsub(pl) is the plasma time. The obtained formula takes into account both the volume and surface effects. It gives the experimentally observed relation between the charge losses and the particle charge Z, the intensity of electric field E because Tsub(pl) varies as 1/E), the average stopping power by the ratio N/R. (Atomindex citation 10:470902)

JINR-R-13-12260 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Registration of Charged Particle Tracks in a Streamer Chamber by Means of Pulsed Laser.
P. Ullmann, H. Ullmann, Yu. A. Shcherbakov, and K. Seliger. 1979, 10p
In Russian.
U.S. Sales Only.

The aim of this work is testing applicability of a nitrogen laser with the longitudinal excitation and a dye laser pumped by the nitrogen laser to register charged particle tracks in a streamer chamber. Tracks were registered by two different shadow methods. It is shown that one could obtain shadowgrams of electron tracks in a helium streamer chamber by adding only 10% CH sub 4 at atmospheric pressure and electric field voltage of about 10 kW/cm. The localization accuracy and sensitivity of determining particle track elements on laser shadowgrams is higher as compared with common photographs. (Atomindex citation 11:497370)

JINR-R-16-12069 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of Radiation Safety.
Unfolding Neutron Spectra in the Energy Range 10 exp -8 -15 MeV from Activation Detectors Data by the Statistical Regularization Method.
V. P. Bamblevskii, and V. V. Grechko. 1978, 11p
In Russian.
U.S. Sales Only.

Technique of neutron spectra unfolding in the energy range 10 exp -8 -15 MeV simultaneously from readings of the neutron activation detectors: resonance, threshold and thermal detectors in polyethylene sphere moderators by the statistical regularization method (SRM) is described. The case, when apriori information on spectrum except of the information on smoothing of the spectrum is practically unknown, is considered; any kind of spectrum interpolation is expelled. The influence of a number of detectors used on the results of unfolding neutron spectra is analyzed, is well as those on meanings of fluences, doses rates equivalent and absorbed doses rates. Obtained results confirm the possibility of reliable unfolding of neutron spectra in a wide energy range by the SRM even when data from the activation detectors are given with the 15% standard deviation. (Atomindex citation 10:470830)

JINR-R-6-10415 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Spectrometry of Radioactive Nuclide Radiation Using Semiconductor Detectors. 5. Organization of Experiments of gamma-Ray Spectrum Measurements.
Ts. Vylov, L. A. Vylova, M. Enikova, B. P. Osipenko, and V. G. Chumin. 1977, 23p
In Russian.
U.S. Sales Only.

Problems of planning and conducting experiments on energy and intensity measurements of gamma-rays by means of semiconductor detectors have been considered. A recommended experiment scheme is presented: 1) choosing optimal experiment time, 2) choosing a spectrometer and the corresponding energy range, 3) measuring the energies of the most intensive gamma -beams for internal calibration. The problems of spectrometer non-linearity, efficiency are discussed, the methods of single and multiple measurements data processing are presented. The analysis is carried out of different assession criteria of the experimental data: 1) taking into consideration couple formation in detector, 2) comparison of the experiment results with the already published ones, 3) calculation of electron spectra of internal convertion. (Atomindex citation 10:446116)

JINR-1-11482 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
90-Channel Cherenkov Mass Spectrometer for High-Energy Electrons and Photons. "Photon" Setup.
S. A. Averichev, V. V. Arkhipov, and R. G. Astvatsaturov. 1978, 26p
In Russian.
U.S. Sales Only.

A 90-channel Cherenkov mass spectrometer for detection of electrons and photons from resonance decays is described. The apparatus includes 90 lead-glass Cherenkov spectrometers, 32 magnetostrictive spark chambers 100x100 cm in size, 6 proportional chambers, a hodoscope of 20 scintillation counters, beam defining scintillation counters. a 80 cm liquid hydrogen target and CAMAC and "Vishnya" electronics. Data collection and analysis have been performed on-line with an HP 2116B computer. (Atomindex citation 10:470826)

JINR-13-11576 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Scanning Automatic Device for Measuring the Distribution of beta -Activity on a Surface.
G. A. Kononenko, V. D. Kuznetsov, V. V. Popov, A. V. Revenko, and M. I. Fominykh. 1978, 13p
In Russian.
U.S. Sales Only.

A scanning automatic device was developed to investigate the beta -activity distribution on a tape of the electromagnetic mass separator receiver. As a detector the beta-counter was used, "scanning" a target throuth the collimator slit. The system could be used to measure the beta-activity on the 80x400 mm exp 2 area. The automatic device operating on-line with the computer is applied to analyze a mass spectrum which appears when separating targets activated by the accelerator. A set of mass spectra of radioactive products was obtained, the apparatus resolution was not worse than 3 mm. The exposition time for each of the single isotope-beam traces was 5 sec, the absolute registration efficiency of beta-particle was about 2%, and the back-ground of the SBT-11 beta-counter was 14 pulses/min. The minimal radioactivity counting by the scanning apparatus was approximately 25 radioactive decays/s. (Atomindex citation 10:441996)

JINR-13-11717 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Time-of-Flight System of the Pion Installation. 1. Construction of the System and Measurements on the Meson Channel.
Yu. A. Akimov, 1978, 12p
In Russian.
U.S. Sales Only.

The time-of-flight system of the PION installation is described which is intended for selecting pions of certain energies out of the meson channel beam of the Dubna synchrocyclotron. The beam consists of pions of relatively large energy dispersion, of muons and electrons. The time-of-flight base is 4.5 m. Dimensions of the first and second counters are 150 x 150 x 15 mm exp 3 and 80 x 80 x 5 mm exp 3 , respectively. The XR-1020 photomultipliers are used in the base counters, two for each scintillator, to compensate time spread due to the final time of light passing into the scintillator. The compensation was realized by summation of amplitudes from two time-to-amplitude convertors. The time-of-flight system resolution was determined on a straight-line part on the meson channel exit by electron component of the 200 MeV/c beam. Peak half-width at the semi-height was 500 ps. (Atomindex citation 10:477313)

KEK-78-2 PC **A03**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Radioactivity Monitors in KEK and Their Calibration Curves for Determining Activity Concentration.
C. Yamaguchi. Apr 78, 37p
U.S. Sales Only.

Radioactivity monitors installed in National Laboratory for High Energy Physics (KEK) are gas monitors (BLU), dust monitors (BRN), and water monitors (VLT). Description of each type of activity monitors is given. The calibration of gas and water monitors was carried out by using a known amount of standard radionuclides. The calibration of dust monitors was made with a disc-loaded standard source whose activity was known. The graphs to convert ratemeter readings into corresponding activity concentration in air and in water are given. (Atomindex citation 10:445339)

KFK-2626 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.).
Thermoluminescence and Phosphate Glass Dosimeter Systems in the Low Dose Range. Description of a Test Program and Results of 43 Systems.
E. Piesch, and B. Burgkhardt. Jun 78, 78p
In German.
U.S. Sales Only.

This report describes a standard test program for TLD and RPL systems worked out by the Working Party on 'Dose Measurement of External Radiation' by the Fachverband fuer Strahlenschutz e.V. to demonstrate the performance of dosimeter systems to be employed in environmental monitoring and in personnel dosimetry. The results of an intercomparison study are outlined in which 17 laboratories from the German speaking countries participated with 43 dosimeter systems. (Atomindex citation 09:415014)

LYCEN-7785 PC **A04**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Recoil and Fast-Particle Spectrometers for the Study of 5GeV Pion-Helium Interactions.
J. P. Burq, M. Chemarin, and M. Chevallier. Dec 77, 71p

U.S. Sales Only.

The instrumentation of an experiment, in which the recoil as well as the fast-particle is measured, is described. The principal aim of the experiment is to search for isobar configurations in the nuclear function of helium by studying 5GeV pion-helium interactions and one pion-proton interactions. In the both first reactions the object X is a pion-nucleon system, which may have been produced on one of the bound nucleons in helium or may have existed prior to the collision. The last one gives the production amplitude from free nucleons. The final-state pions which are scattered in a narrow forward half cone, are measured in a spectrometer consisting of multiwire proportional counters (MWPC) and a magnet. The residual slow nuclei are measured and identified in a recoil spectrometer with MWPC's, solid state detectors and scintillators as the basic components. With these spectrometers the nuclear and the hadron states can be specified up to very high energies as long as the missing mass resolution is sufficient to separate the different resonances in X from each other. (Atomindex citation 11:497311)

MPI-PAE/Exp.El.-69 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Physik und Astrophysik, Munich (Germany, F.R.).
Performance of Drift Chambers Without Field-shaping in High Magnetic Fields.
W. de Boer, B. Budjarek, W. Fues, G. Grindhammer, and R. Kotthaus. Mar 78, 21p
U.S. Sales Only.

The performance of drift chambers without field-shaping has been studied in strong magnetic fields transverse to the electric drift field. Cells with maximum drift lengths of 7.5 mm and filled with Ar/hydrocarbon gas mixtures can be operated at full efficiency in fields of up to 14.3 kG. A detailed study of the space-time relation for perpendicular and inclined tracks shows excellent agreement between the experimental results and the predicitons from a simplified model of the drift process. The spatial accuracy is not degraded by the magnetic field. The observed rms resolution of 160 mu at B=14.3 kG is limited by systematic effects. The intrinsic accuracy measured at B=0 under ideal conditions is 62 mu. (Atomindex citation 10:421520)

NRL-MR-4171 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Absolute Calibration of a Prompt gamma Ray Detector for Intense Bursts of Protons.
F. C. Young, F. Oliphant, S. J. Staphanakis, and A. R. Knudson. 31 Mar 80, 33p
Contract EX-76-A-34-1006

A detector for determining the itensity and duration of kiloampere pulsed proton beams is described. Proton intensities are inferred from measurements of prompt gamma rays of 6 to 7 MeV from the exp 19 F(p,a gamma) exp 16 O reaction. The thick-target yield for this reaction on a teflon target was measured for 0.5 to 2.8 MeV protons. Two different size detectors were calibrated absolutely using the continuous proton beam from a Van de Graaff accelerator. An absolute measurement of a kiloampere pulsed proton beam is described, and the measured current is in agreement with an independent determination of the total proton intensity by nuclear activation. (ERA citation 05:024563)

PAT-APPL-6-078 759 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Cadmium Telluride Photovoltaic Radiation Detector.
Patent Application,
D. C. Agouridis, and R. J. Fox. Filed 25 Sep 79, 12p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A dosimetry-type radiation detector is provided which employs a polycrystalline, chlorine-compensated cadmium telluride wafer fabricated to operate as a photovoltaic current generator used as the basic detecting element. A photovoltaic junction is formed in the wafer by painting one face of the cadmium telluride wafer with an n-type semiconductive material. The opposite face of the wafer is painted with an electrically conductive material to serve as a current collector. The detector is mounted in a hermetically sealed vacuum containment. The detector is operated in a photovoltaic mode (zero bias) while DC coupled to a symmetrical differential current amplifier having a very low input impedance. The amplifier converts the current signal generated by radiation impinging upon the barrier surface face of the wafer to a voltage which is supplied to a voltmeter calibrated to read quantitatively the level of radiation incident upon the detecting wafer. (ERA citation 05:029544)

PCCF-T-79-01 PC **A07**/MF **A01**
Clermont-Ferrand-2 Univ., Aubiere (France). Lab. de Physique Corpusculaire.
Scintillation Detector Set Measuring the Charge Particle Energy.
These (D. Ing.),
C. Dore. 1979, 136p
In French.
U.S. Sales Only.

The S143 experiment, at CERN in 1976, needed both the measurement and the identification of light nuclei, and especially the separation between exp 3 H and exp 3 He, over a large energy range. In the chosen solution, in addition to semiconductor detectors, some scintillation counters are used. The non-linearity of light versus energy of charged particles was complicated by the fact there was two different linear laws according to the charge of particles. To obtain good analogic signals over a dynamic range nearly equal to 200, the signals from several dynodes were used simultaneously. In the experimental setting up, each scintillator was put directly in contact with the corresponding photocathode. In spite of a special shielding, some perturbations due to the magnet placed close by required to bring important corrections to linear laws. Thanks to complementary informations from semiconductor counters, a full separation between charge 1 and charge 2 particles was possible. A suitable identification as guaranted among charge 1 particles, but only kinematic constraints gave the possibility to extract exp 4 He corresponding to the elastic scattering. (Atomindex citation 11:497312)

SAND-78-1188 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Neutron Generator Instrumentation at the Department 2350 Neutron Generator Test Facility.
T. C. Bryant, and G. R. Mowrer. Jun 79, 19p
Contract EY-76-C-04-0789

The computer and waveform digitizing capability at the test facility has allowed several changes in the techniques used to test neutron generators. These changes include methods used to calibrate the instrumentation and changes in the operation of the test facility. These changes have increased the efficiency of the test facility as well as increasing both timing and amplitude accuracy of neutron generator waveforms. (ERA citation 05:001706)

SLAC-TN-79-3 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Microcomputer-Based Monitoring and Control System.
D. Talaska. Mar 79, 13p
Contract EY-76-C-03-0515

This report describes a microcomputer-based monitoring and control system devised within, and used by, the Cryogenic Operations group at SLAC. Presently, a version of it is operating at the one meter liquid hydrogen bubble chamber augmenting the conventional pneumatic and human feedback system. Its use has greatly improved the controlled tolerances of temperature and pulse shape, and it has nearly eliminated the need for operating personnel to adjust the conventional pneumatic control system. The latter is most important since the rapid cycling machine can demand attentions beyond the operator's skill. Similar microcomputer systems are being prepared to monitor and control cryogenic devices situated in regions of radiation which preclude human entry and at diverse locations which defy the dexterity of the few operators assigned to maintain them. An IMSAI 8080 microcomputer is basic to the system. The key to the use of the IMSAI 8080 in this system was in the development of unique interface circuitry, and the report is mostly concerned with this. (ERA citation 04:047316)

STH-22/77 PC **A03**/MF **A01**
Bundesgesundheitsamt, Neuherberg (Germany, F.R.). Inst. fuer Strahlenhygiene.
Calibration of New Measuring Arrays to Determine the Emission of Radioactive Noble Gases.
H. J. Kreiner, and I. Winkelmann. Dec 77, 41p
In German.
U.S. Sales Only.

This report describes the calibration of different systems for the integral measurement of radioactive noble gases and the calibration of a measuring chamber for the detection of individual nuclides of radioactive noble gases in the gaseous effluent of nuclear power plants. For these measuring chamber the calibration factors for exp 85 Kr and exp 133 Xe are given as well as the detection limits to be obtained with these measuring systems for several radioactive noble gases present in the gaseous effluent at the stack of nuclear power plants. Calibration factors for exp 85 Kr und exp 133 Xe and the detection limits of this measuring method for the detection of individual nuclides of radioactive noble gases in air samples are defined taken with a high pressure compressor in pressure flasks and measured on a Ge(Li)-spectrometer (pressure flask measuring method). A measuring equipment is described and calibrated which allows simultaneous measurement of activity concentration of radioactive noble gases and radioactive aerosols with a sensitivity of 2. (period on line) 10 exp -7 Ci/m exp 3 for radioactive gases and 1. (period on line) 10 exp -9 Ci/m exp 3 for radioactive particulates at a background radiation of 1 R/h. (orig.) 891 HP. (Atomindex citation 10:433862)

TNO-RD-E-7606-173 PC **A02**/MF **A01**
Gezondheidsorganisatie TNO, Arnhem (Netherlands). Radiologische Dienst.
Results of the Euratom Intercomparison Workshop by CEA in Fontenay-aux Roses.
C. W. Verhoef. 1976, 11p CONF-7611104-1
In Dutch.Euratom intercomparison workshop, Fontenay-aux Roses, France, 19 Nov 1976.
U.S. Sales Only.

The results of a comparative evaluation of 5 different dosemeters are given in this report. The dosemeters tested were: a TNO thermoluminescent dosemeter, thermoluminescent dosemeters with a perspex phantom, a victorian type 555 dosemeter with ionization chamber, a TNO filmbadge and a Harwell filmbadge. These dosemeters were calibrated with the help of a 9 MeV gamma implies capture beam and tested with the help of a cobalt 60 gamma ray source. (Atomindex citation 09:401798)

TNO-RD-E-7611-184 PC **A02**/MF **A01**
Gezondheidsorganisatie TNO, Arnhem (Netherlands). Radiologische Dienst.
Possible Use of BeO in beta-gamma Personnel Dosimetry.
G. Busuoli, and H. W. Julius. 1977, 12p CONF-770201-3
International conference on luminescence dosimetry, Sao Paulo, Brazil, 14 Feb 1977.
U.S. Sales Only.

Beryllium oxide is one of the cheapest TL detectors commercially available. To investigate whether this material could be applied as an alternative to other low Z materials such as LiF, a comparison was made between 3 BeO discs, differing in thickness and diameter, and the 3 X 3 X 0.9 mm LiF chip. The TLD's were irradiated in a plastic holder, simulating a possible future two element personal badge. All readings were performed with an automatic hot-gas TLD reader. Reproducibility, dose linearity, energy dependence and detection threshold were investigated, using photons from 10 keV X-rays up to exp 60 Co-gamma radiation. Beta responses were measured using the NPL secondary standard sources exp 147 Pm, exp 204 Tl and exp 90 Sr/ exp 90 Y. From the results obtained with BeO, it is concluded that at least two of the three detectors investigated can be regarded as satisfactory for personnel dosimetry. (Atomindex citation 09:401784)

UJF-004/2/78 PC **A02**/MF **A01**
Ustav Jaderne Fysiky, Rez (Czechoslovakia).
Multichannel System for Angular Distribution Measurements.
V. Burjan, V. Kroha, and K. Putz. 23p

U.S. Sales Only.

A description is given of the individual blocks of the spectrometric apparatus used for measuring the angular distribution of particle spectra and excitation functions of (d,p) reactions at an electrostatic accelerator and the U-120 M cyclotron, both operating at the Nuclear Physics Institute of the Czechoslovak Academy of Sciences at Rez. Main attention was devoted to attaining maximum energy resolution at a high measurement efficiency, this by installing 8 independent spectrometric chains allowing simultaneous measurement of angular distribution in 8 points of the beam. The semiconductor detectors were cooled to -40 degC to -60 degC, which significantly reduced the level of inherent detector noise. An energy resolution of 13 keV was attained using Tesla detectors at a particle energy of 11 MeV. A brief review of data processing and software is given. (Atomindex citation 10:456241)

WIS-PH-79/11 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
Heavy Ion Timing with Very Low Pressure MWPC'S.
A. Breskin, R. Chechik, and N. Zwang. 1979, 11p
U.S. Sales Only.

A multiwire proportional chamber (MWPC) has been operated at gas pressures below 1 torr. A time resolution of about 100 psec (FWHM) has been reached with 27 MeV exp 16 0 ions. The mechanism of operation, some of the properties and possible applications are discussed. (Atomindex citation 10:477331)

18E. Nuclear Power Plants

AED-Conf-77-020-001 PC **A03**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Site Provision Planning for Nuclear Power Plants and Other Large-Scale Projects with Environmental Relevance in the FRG.
W. Blumel. 1977, 33p CONF-770158-1
In German.48. colloquium on energy law, Koeln, F.R. Germany, 27 Jan 1977.
U.S. Sales Only.

As regards conflicts in interest in connection with site planning and site decisions, the author evolves the following theses: 1) Site provision planning by the Federal Government as in Baden-Wuerttemberg and North Rhine-Westphalia; 2) clarification of the Federal Government's competences; 3) prompt and adequate participation of those concerned; 4) increased influence of the Federal Government, e.g. basic site planning by the Federal government and authority of the Federal government to issue directives (section 85 Basic Law) to the Laender regarding site provision planning; 5) solutions to the problems of citizen participation and the question of legal protection; 6) standardization of a design and hearing procedure at an early date within the area planning laws of the Federal government, the area planning laws to be open to further development. (Atomindex citation 09:368083)

IJS-106/2014-76 PC **A08**/MF **A01**
Institut Jozef Stefan, Ljubljana (Yugoslavia).
Selection of Suitable Sites for NPP in Slovenia (Stage 3).
M. Grgic, L. Fabjan, and U. Premru. 1977, 159p
In Slovenian.
U.S. Sales Only.

Selection of suitable sites for nuclear power plants in Slovenia is considered. This includes the studies of available data on regional and local characteristics specified in general site suitability criteria for NPP. The most suitable selected sites will be included into land use urbanistic planning of Slovenia. (Atomindex citation 10:423591)

INIS-mf-4439 MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Current Problems Associated with Nuclear Plant Construction Contracts.
R. Albano. 1977, 13p CONF-7710196-3
Nuclear Inter June 1977, Florence, Italy, 2 Oct 1977.
U.S. Sales Only. Microfiche copies only.

No abstract available.

INIS-mf-5405 MF **A01**
Vyzkumny Ustav Energeticky, Prague (Czechoslovakia).
Reliability Analysis of Self-Supply System of V-1 Nuclear Power Plant.
B. Kuklik. 70p
In Czech.
U.S. Sales Only. Microfiche copies only.

The results are summarized of the fault tree analysis of the V-1 power plant self-consumption system. The 6 kV busbars providing power for the main circulating pumps, the steam generator feed pumps and other important components including the 0.4 kV busbars are of the highest importance for nuclear safety. A fault tree analysis was also made of the emergency core cooling system of the reactor. Dangerous faults are defined and fault trees are developed. A brief description is given of the calculation algorithm for a digital computer. Some results are discussed. The calculated reliability of the emergency core cooling system is 10 exp 5 years, of the 6 kV busbars it is 6.6x10 exp 4 years. In case of a permanent or a long-term outage of the 220 kV stand-bye power supply, the system reliability is reduced to 7x10 exp 2 years. (Atomindex citation 11:502956)

JAERI-M-7728 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Overview of Japanese Seismic Research Program for HTR.
T. Ikushima. Jul 78, 28p
U.S. Sales Only.

In order to obtain the license for construction and operation of HTR developed and introduced into Japan, it is necessary to assure integrity of reactor structures and the capability of reactor shutdown and maintain safety shutdown for the seismic design condition. Because Japanese land is located in relatively high seismacity zone, when an excessive earthquake would occur, the public and plant personnel should be protected from radiation hazard. For the above reason, many efforts of seismic research and development for HTR have been made at institutes and companies in Japan. In the paper, descriptions are: (1) Present status of development and construction plans of HTR, (2) guideline of aseismic design, (3) need of aseismic research, (4) present status of research and development, (5) future plan. (Atomindex citation 10:430285)

JAERI-M-8083 PC **A14**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Design and Safety Data of Commercial Nuclear Power Plants in Japan. 1978 Edition.
F. Izumi, Y. Harayama, and T. Nakazima. Feb 79, 320p
In Japanese.
U.S. Sales Only.

Following the previous JAERI-M 6732(1976) and JAERI-M 7261(1977), the 1978 edition as of the December is presented, which contains the data of design parameters, performance, components and equipments in nuclear power plants of Japan. Data are given in tables by computer processing. (Atomindex citation 11:497541)

NRCN-448 PC **A09**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Derivation of Reduced Model for Control System Design Using Chebyshev Techniques.
Thesis (M. Sc.),
Y. Bistritz. Jul 78, 181p
In Hebrew.
U.S. Sales Only.

New methods are developed for reduced-order modelling of high-order, linear, time-invariant systems characterized by a transfer function. The first method is based on manipulating two Chebyshev polynomial series, one representing the frequency characteristics of the high-order system and the other representing the approximating low-order model. The proposed method can be viewed as generalizing the classical Pade approximation problem, with Chebyshev polynomial series being over a desired frequency interval instead of a power series about a single frequency point. The second method is based on approximating the high-order transfer function in terms of best Chebyshev approximation on a desired domain in the complex plane. An algorithm to find for a complex function best Chebyshev rational approximations in the complex plane is suggested and its theoretical basis confirmed. The algorithm is based on a complex version of Lawson algorithm that is applied to a complex version of a rational least square approximation program. (Atomindex citation 10:455908)

NUREG/CR-0508 PC **A09**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Security Communication Systems for Nuclear Fixed Site Facilities.
Technical rept. Jan 77-Apr 80,
Larry C. Howington, and Louis L. Taylor. Jul 80, 193p Y/DW-128
Prepared in cooperation with Johnson (Bernard), Inc., Houston, TX.

This report presents a basic discussion of communication techniques and factors relevant to designing communication systems for nuclear fixed site facility security systems. The reader is provided communication fundamentals, design considerations, and specification techniques. Copious references and an annotated bibliography are provided for individuals who desire to delve deeper than the limits and areas of study of this report. Ease of reading and use of this report are enhanced by relegating detailed communication design treatise to the Appendices. Sample procurement specifications are provided throughout the report for various communication system components and are distinguished from the regular text by using a smaller type.

NUREG-0694 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
TMI-Related Requirements for New Operating Licenses.
Technical rept.
Jun 80, 45p

There are four types of TMI-related requirements and actions approved by the Commission for new operating licenses: (1) those required to be completed by a license applicant prior to receiving a fuel-loading and low-power testing license, (2) those required to be completed by a license applicant prior to receiving a license to operate at appreciable power levels up to full power, (3) those the NRC will take prior to issuing a fuel-loading and low-power testing or a full-power operating license, and (4) those required to be completed by a licensee prior to a specified date. In this report, only those dated requirements that have already been issued are of interest. Other dated requirements are expected to be issued in the future as work progresses in accordance with the TMI Action Plan. This report summarizes the several parts of the list of TMI-related requirements approved by the Commission for new operating licenses.

NUREG-0698 PC **A02**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
NRC Plan for Cleanup Operations at Three Mile Island Unit 2,
Ronnie Lo, and Bernard J. Snyder. Jul 80, 25p

The NRC plan defines the functional role of the NRC in cleanup operations at Three Mile Island Unit 2 to assure that agency regulatory responsibilities and objectives will be fulfilled. The plan outlines NRC functions in TMI-2 cleanup operations in the following areas: (1) the functional relationship of NRC to other government agencies, the public, and the licensee to coordinate activities, (2) the functional roles of these organizations in cleanup operations, (3) the NRC review and decision-making procedure for the licensee's proposed cleanup operation, (4) the NRC/licensee estimated schedule of major actions, and (5) NRC's functional role in overseeing implementation of approved licensee activities.

PB80-202104 PC **A08**/MF **A01**
Performance Development Inst., Washington, DC.
An Assessment of an Experiment in Accelerating the Development of Nuclear Standards.
Final rept.,
Jane P. Woodward, and Stephen D. Garrity. Jun 80, 154p NBSIR-80-2086
Contract NBS-7-35822

As part of its program on regulatory experimentation, the Experimental Technology Incentives Program conducted a project with the Nuclear Regulatory Commission on accelerating the standards development process. This report assesses the execution and outcomes of the project with a specific focus on whether further work is needed on the project and on how to improve future experimental designs. The report includes sections on agency and project background, project initiation, project plans, what actually happened, what was learned about the standards development process, and factors to consider in the design of other experiments.

UCRL-15078 PC **A03**/MF **A01**
TERA Corp., Berkeley, CA.
Seismic Risk Analysis for the Babcock and Wilcox Facility, Leechburg, Pennsylvania.
21 Oct 77, 46p
Contract W-7405-ENG=48

The results of a detailed seismic risk analysis of the Babcock and Wilcox Plutonium Fuel Fabrication facility at Leechburg, Pennsylvania are presented. This report focuses on earthquakes; the other natural hazards, being addressed in separate reports, are severe weather (strong winds and tornados) and floods. The calculational method used is based on Cornell's work (1968); it has been previously applied to safety evaluations of major projects. The historical seismic record was established after a review of available literature, consultation with operators of local seismic arrays and examination of appropriate seismic data bases. Because of the aseismicity of the region around the site, an analysis different from the conventional closest approach in a tectonic province was adapted. Earthquakes as far from the site as 1,000 km were included, as were the possibility of earthquakes at the site. In addition, various uncertainties in the input were explicitly considered in the analysis. The results of the risk analysis, which include a Bayesian estimate of the uncertainties, are presented, expressed as return period accelerations. The best estimate curve indicates that the Babcock and Wilcox facility will experience 0.05 g every 220 years and 0.10 g every 1400 years. The bounding curves roughly represent the one standard deviation confidence limits about the best estimate, reflecting the uncertainty in certain of the input. Detailed examination of the results show that the accelerations are very insensitive to the details of the source region geometries or the historical earthquake statistics in each region and that each of the source regions contributes almost equally to the cumulative risk at the site. If required for structural analysis, acceleration response spectra for the site can be constructed by scaling the mean response spectrum for alluvium in WASH 1255 by these peak accelerations. (ERA citation 05:004922)

UCRL-15103 PC **A12**/MF **A01**
Structural Measurement Systems, Inc., Santa Clara, CA.
Detection of Damage in Structures from Changes in Their Dynamic (Modal) Properties: A Survey.
Sep 79, 274p
Contract W-7405-ENG-48

Much of the newly developed technology in vibration measurement, digital signal processing and parameter identification can be utilized for monitoring the integrity of a variety of structural components in nuclear power plants. Although vibration levels in certain key components such as coolant pumps, turbo generators and the reactor core are currently monitored, simple checking of overall vibration levels is often not a sensitive enough indicator of impending failure in a structure. A more sophisticated approach to signal processing is examined which involves the identification of parameters describing the so called modes of vibration of a vibrating structure. (ERA citation 05:008506)

WAPD-MRP-152 PC **A03**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Shippingport Atomic Power Station (PWR). Technical Progress Report, January 26, 1979-July 25, 1979.
1979, 32p
Contract EY-76-C-11-0014

The Shippingport Atomic Power Station operated at essentially full power until March 23, 1979, when a scheduled maintenance and testing shutdown began. During cold physics testing, the measured value of the flow coefficient of reactivity was higher than determined during previous testing. As a result the shutdown was extended to evaluate the flow coefficient of reactivity in more detail. The additional test data gave strong evidence that the flow reactivity effect is principally one of small core module radical displacements due to module bending and taking up of radial clearances. Evaluation of the thermal effects of the increased flow coefficient of reactivity resulted in changes to core protection setpoints and station operating procedures without changing core thermal criterial or allowable power. The revised setpoints were based on the conservative assumption that the flow coefficient of reactivity was three times the value measured during the test program. Additional testing has been scheduled to monitor the flow coefficient of reactivity periodically. During return of the station to power operation on May 24, 1979, a rubbing noise was detected internal to the main unit generator. The station was shut down to investigate the noise which was found to originate from the hydrogen circulator fan. After fan repairs were completed the Station returned to power operation on July 23, 1979.All other evaluated core test data taken during the shutdown and during core operations continue to show that the core operates in accordance with design predictions. During the periods of power operation only routine periodic maintenance was required to maintain the operational readiness of the plant. (ERA citation 05:008486)

18F. Radiation Shielding and Protection

AED-Conf-78-004-003 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Safety of the Containment. Principles and Proving Rupture Protection of Reactor Pressure Vessels in Light-Water Nuclear Power Plants.
K. Kussmaul. 1978, 4p CONF-780149-11
In German.Meeting on the safety of the light-water reactor, Mainz, F.R. Germany, 16 Jan 1978.
U.S. Sales Only.

As the toughness of basic materials and welded joints is the decisive precondition for safety, all influencing parameters impairing this property and enhancing crack formation during manufacture and operation, were analysed. Considerations were based on some rupture incidents, above all during pressure tests, in connection with conventional operation. These incidents could not be explained sufficiently on account of the condition of the materials not being known or not being examinable. The quality-reducing influences determined within the framework of extensive R+D programmes on the materials 22 NiMoCr 37 and 20 MnMoNi 55 in several PV components, and determined during comprehensive parameter studies, could be quite clearly attributed to a non-optimal chemical composition of the steels used in connection with trace element amounts too high. Thus, the principles for a successful optimization of the materials were given, which has been carried out, in connection with the use of sophisticated steel production techniques, for the required ingot weights up to 5.6 MN. The results were highly pure, segregation-resistant, highly tough, processing-intensitive, and safe materials. The long-term behaviour under corrosion and radiation, as well as the ability to assess the material in fracture mechanics tests and in non-destructive test methods, was thus decisively improved upon in this context, which meant that an absolute rupture protection could be proven. (Atomindex citation 09:386685)

ANL-80-27 PC **A04**/MF **A01**
Argonne National Lab., IL.
Slow Neutron Leakage Spectra from Spallation Neutron Sources.
S. G. Das, J. M. Carpenter, and R. E. Prael. Feb 80, 73p
Contract W-31-109-ENG-38

An efficient technique is described for Monte Carlo simulation of neutron beam spectra from target-moderator-reflector assemblies typical of pulsed spallation neutron sources. The technique involves the scoring of the transport-theoretical probability that a neutron will emerge from the moderator surface in the direction of interest, at each collision. An angle-biasing probability is also introduced which further enhances efficiency in simple problems. These modifications were introduced into the VIM low energy neutron transport code, representing the spatial and energy distributions of the source neutrons approximately as those of evaporation neutrons generated through the spallation process by protons of various energies. The intensity of slow neutrons leaking from various reflected moderators was studied for various neutron source arrangements. These include computations relating to early measurements on a mockup-assembly, a brief survey of moderator materials and sizes, and a survey of the effects of varying source and moderator configurations with a practical, liquid metal cooled uranium source Wing and slab, i.e., tangential and radial moderator arrangements, and Be vs CH sub 2 reflectors are compared. Results are also presented for several complicated geometries which more closely represent realistic arrangements for a practical source, and for a subcritical fission multiplier such as might be driven by an electron linac. An adaptation of the code was developed to enable time dependent calculations, and investigated the effects of the reflector, decoupling and void liner materials on the pulse shape. (ERA citation 05:024952)

AREAEE-214 PC **A03**/MF **A01**
Atomic Energy Establishment, Inshas (Egypt).
Measurements of Angular and Energy Distributions of gamma-Rays Resulting from Neutron Interactions in Shielding Barriers.
A. S. Makarious, R. M. A. Maayouf, and R. Megahid. 1978, 35p
U.S. Sales Only.

Measurements of both angular and energy distributions of secondary gamma rays resulting from interactions of neutrons emerging from one of the ET-RR-1 reactor beam holes into barriers of iron, lead and water are reported. The measurements were carried out, both with a bare neutron beam and with the beam being transmitted through a B exp 4 C filter, using a stilbene crystal gamma spectrometer. The spectrometer applies discrimination between neutrons and gammas according to the difference in decay times of the scintillations produced by them in stilbene. The described angular distributions resulted from measurements made at different angles of neutron incidence and with three different thicknesses of each sample. (Atomindex citation 10:453935)

CNAEM-172 PC **A04**/MF **A01**
Cekmece Nuclear Research and Training Center, Istanbul (Turkey).
Total Cross Section of Pure Amorphous Carbon.
S. Dokmen. 1977, 66p
In Turkish.
U.S. Sales Only.

In this study, the slow neutron total cross section of pure amorphous carbon (99.99%) has been measured in the energy range from 0.0621 to 6 eV by transmission method. The measurements were made with a crystal spectrometer of the TR-1 reactor using the Be(101 tilde 1) and the Be(123 tilde 1) crystal planes as monochromators. The mean values of slow neutron total cross section of pure amorphous carbon sigmaLT=4.78+-0.16 barns obtained is in agreement with the values given by different research workers using graphite and powder diamond in same energy region and higher energy regions as well. It seems that, at least at these energy regions, the crystallization has no sensible effect on the total cross section. On the contrary, no agreement was found with the values of sigmaLT=9.12+-0.20 barn given for total cross

section of carbon black of 95% purity. (Atomindex citation 10:454078)

FRNC-TH-851 PC **A07**/MF **A01**
Toulouse-3 Univ. (France).
Method of Transport Simulation for Electrons Between 10EV and 30KEV.
M. Terrissol. 1978, 141p
In French.These (D. es S.).
U.S. Sales Only.

A transport simulation of low-energy electrons in matter using a Monte-Carlo method and studying all the interactions of the electrons with atoms, molecules or assemblies of them is described. Elastic scattering, ionization, excitation, plasmon creation, reorganization following inner-shell ionization, electron-hole pair creation ... are simulated individually by sampling of confirmed experimental or theoretical cross sections. In this way atomic and molecular gases, metals such as aluminium and liquid water have been studied. The simulation allows one to follow the electrons until their energy reaches the atomic or molecular ionization potential of the irradiated matter. The entire trajectories of the primary electron and of all secondaries set in motion are exactly reproduced. Several applications to multiple scattering, radiobiology, microdosimetry, and electronic microscopy are presented, and some results are directly compared with experimental ones. (Atomindex citation 11:503487)

IAEA-207 PC **A99**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Differential and Integral Nuclear Data Requirements for Shielding Calculations.
1978, 607p CONF-761081-
Specialists meeting on nuclear data requirements for shielding, Vienna, Austria, 8 Oct 1976.
U.S. Sales Only.

Abstracts for each paper have been entered into the data base. (MOW) proposed experimental programme and the possible modes of operation of the device. A detailed account of the project is given in the rest of the report of which Chapters IV and VII comprise the engineering design and the staff and cost estimates respectively. (Atomindex citation 10:419620)

IKF-37 PC **A08**/MF **A01**
Frankfurt Univ. (Germany, F.R.). Inst. fuer Kernphysik.
Annual Report 1977.
H. Schmidt-Boecking, and E. Steuer. 1977, 163p
U.S. Sales Only.

Separate abstracts were entered individually into the data base. (Atomindex citation 10:419595)

INIS-mf-4126 PC **A04**/MF **A01**
Instituto de Radioprotecao e Dosimetria, Rio de Janeiro (Brazil).
Radiation Protection in the Thorium Industry.
A. Moraes. Jan 77, 51p
In Portuguese.
U.S. Sales Only.

The evaluation of radiation doses in a monazite processing plant (thorium production cycle) aimed at getting information on the exposure levels to beta and gamma radiation, is discussed. It is observed that, excluding places where monazite is stored, or during transportation, or in silos, or waste deposits, or in places where high activity materials are stored or treated, the external exposures stay below the maximum permissible limit. Some recommendations are made based on the results found and according to radiation protection standards. (Atomindex citation 09:365641)

INIS-mf-4159 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Operating Experience and Radiation Protection Problems in the Working of the Radio-Metallurgy Hot Cell Facilities at BARC.
S. Janardhanan, S. B. Watamwar, S. K. Mehta, P. M. B. Pillai, and Jacob John. 1977, 28p
CONF-7703110-1
Conference of the Indian Association for Radiation Protection, Madras, India, 12 Mar 1977.
U.S. Sales Only. Microfiche copies only.

The Bhabha Atomic Research Centre at Bombay has six hot cell facilities for radiometallurgical investigations of irradiated/failed fuel elements. The hot cell facilities have been provided with certain built-in safety features, a ventilation system, radiation monitoring instruments for various purposes, a centralised air monitoring system and a central panel for display of various alarms. Procedures adopted for radiation protection and contamination control include: (1) radiation leak test for cells and filter efficiency evaluation before cell activation, (2) practices to be followed by frog suit personnel while working in hot cell areas, (3) receipt and handling of irradiated fuel elements, (4) cell filter change operation, (5) checks on high level drains and (6) effluent discharge and waste shipments. Operating experience in the working of these facilities along with radiation accident incidents is described. Data regarding release of activity during normal cell operations, dose rates during various metallurgical operations and personnel exposures are presented. (Atomindex citation 09:376216)

INIS-mf-4950 MF **A01**
ELectron Stopping of Heavy Ions in Matter.
I. A. Akhiezer, and L. N. Davydov. 1978, 351p
CONF-7805178-P3
In Russian.Conference on reactor materials science, Alushta, Ukrainian SSR, 29 May 1978.
U.S. Sales Only. Microfiche copies only.

The theory of heavy ion stopping by electrons in solids is analyzed with an aim to establish which physical mechanisms are of importance at different ion velocity values v. The theory is presented for deep inelastic collisions taking the main part in stopping at v > Z sub 1 /sup 1/3/ v sub 0 (z sub 1 is the atomic number of the ion, v sub 0 is the Bohr velocity). Elastic scattering (relative to the incident ion) is investigated. It is shown that the contribution from these processes to the stopping cross-section is predominant at Z sub 1 /sup 1/3/ v sub 0 > v > Z sub 1 /sup 2/3/ v sub 0 . (Atomindex citation 10:453220)

INIS-mf-5264 PC **A02**/MF **A01**
UKAEA Risley Nuclear Power Development Establishment, Culcheth (England). Safety and Reliability Directorate Culcheth.
Deterministic and Probabilistic Approaches to Nuclear Site Hazard Evaluation and Licensing.
J. R. Beattie, G. D. Kaiser, P. J. Cooper, and F. Abbey. 1978, 10p CONF-781022-132
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only.

The meaning of the phrase "nuclear accident" is investigated against the background of ICRP recommendations and related directives and the merits of the probabilistic approach to nuclear safety are surveyed in this light. The usefulness of the Emergency Reference Level is examined. How permitted accident frequencies should vary with accident size is important, as the suitability of the chosen measures of accident size eg number of early or delayed deaths. The SRD computer code TIRION is used to illustrate such effects, and results of significance to the choice of nuclear site selection methods are presented. (Atomindex citation 11:496843)

JAERI-M-7594 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
LWR Containment Spray Iodine Removal Calculation Code. MIRA-PB.
G. Nishio, M. Tanaka, and T. Tamura. Mar 78, 113p
In Japanese.
U.S. Sales Only.

In the reactor containment vessel of LWR, there are containment sprays and air-cleaning filters to prevent the release of radioiodine from the reactor building to the atmosphere in LOCA. The computer code MIRA-PB for predicting iodine removal by containment spray is made on the basis of MIRAP/MIRAB code developed in Battelle's Columbus Laboratories. MIRA-PB considers behavior of elemental iodine, organic iodide, and iodic aerosol in natural deposition, liquid-film absorption, spray washout, filteration, and leakage to atmosphere. Information is obtained on the contributions of sprays to iodine removal under LOCA conditions which depends on partition coefficient of elemental iodine and organic iodide, pH, temperature, concentrations in gaseous and liquid phases, physical properties of spray, motion of spray droplets in the containment vessel, and mass-transfer rate from gaseous to liquid phase. Iodine removal by sprays in PWR, BWR, Battelle's CSE and JAERI-model containment is calculated by MIRA-PB under LOCA simulated condition. (Atomindex citation 10:430330)

JAERI-M-8074 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Neutron Self-Shielding Factor of UO sub 2 Pellets for exp 99 Mo Production.
H. Yamabayashi. Feb 79, 11p
In Japanese.
U.S. Sales Only.

Neutron self-shielding factors of UO sub 2 pellets(2.56% enrichment) were measured by irradiation with JRR-2 and JRR-3, in connection with the exp 99 Mo production by neutron-induced fission of exp 235 U. The neutron self-shielding factor was obtained as the ratio of the effective neutron flux derived from the measured exp 99 Mo activity to the thermal neutron flux measured by a flux monitor in the absence of the UO sub 2 target. The neutron self-shielding factors of UO sub 2 pellets of 1.2, 12 and 120g are 0.76, 0.65 and 0.58, respectively. These values are 30% smaller than those calculated by Gilat's formula. (Atomindex citation 11:496971)

JCU/NP-54 PC **A03**/MF **A01**
James Cook Univ. of North Queensland, Townsville (Australia). Dept. of Physics.
Elastic Scattering of Low Energy gamma -Rays. 2. Theoretical Cross Sections for Scattering of exp 152 Eu gamma -Rays by Pb.
I. B. Whittingham. May 78, 42p
U.S. Sales Only.

Theoretical cross sections for the elastic scattering of 245, 334, 444, 779, 1086, 1112 and 1408 keV gamma -rays by Pb are obtained for scattering angles up to 150 degrees. Three sets of Rayleigh scattering amplitudes have been computed using (1) the calculations of Johnson and Cheng, (2) the K shell calculations of Brown and co-workers supplemented by form factors amplitudes for higher shells, and (3) form factor amplitudes for all shells. Nuclear Thomson amplitudes have been included for all energies and, for 1408 keV, Delbruck scattering based upon the calculations of Papatzacos and Mork has been included. Nuclear resonance scattering is shown to be negligble for all energies. (Atomindex citation 10:474677)

KFTI-77-38 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Radiation of Relativistic Charged Particles in Crystals on Channeling.
A. I. Akhiezer, V. F. Boldyshev, and N. F. Shul'ga. 1977, 9p
In Russian.
U.S. Sales Only.

The emission spectrum of relativistic charged particles in crystals on channeling was investigated. It is shown that the emission nature on channeling differs essentially from that in an amorphous medium and in crystals without channeling. The intensity of emission of channeled particles is several orders higher than that from an amorphous medium. The emission spectra of electrons and positrons are different and so are the emission spectra in axial and plane channeling. (Atomindex citation 10:427888)

KURRI-TR-157 PC **A03**/MF **A01**
Kyoto Univ., Kumatori, Osaka (Japan). Research Reactor Inst.
Fiscal 1974 Indoor Radiation Control Results in Research Reactor Institute, Kyoto University, (11).
K. Katsurayama, T. Tujimoto, M. Saito, T. Tsuruta, and M. Fukui. 1977, 33p
In Japanese.
U.S. Sales Only.

Indoor radiation control results in fiscal 1974 of KURRI are described as follows: regular radiation control for facilities excluding CA building; regular radiation control for CA (Critical Assembly) facilities; general radiation control; and radiation moni-

toring in the CA building. In the RRI, the research reactor of 5000 kW heat output has been operated with high rate, and in fiscal 1974, the critical assembly was completed. Thus radiation control equipments and personnel were increased, but the personnel exposure was kept low. (Atomindex citation 09:411371)

LA-UR-80-1159 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Deep Penetration Calculations.
W. L. Thompson, O. L. Deutsch, and T. E. Booth. Apr 80, 29p CONF-800471-1
Contract W-7405-ENG-36
Seminar on theory and applications of Monte Carlo methods, Oak Ridge, TN, USA, Apr 1980.

Several Monte Carlo techniques are compared in the transport of neutrons of different source energies through two different deep-penetration problems each with two parts. The first problem involves transmission through a 200-cm concrete slab. The second problem is a 90 exp 0 bent pipe jacketed by concrete. In one case the pipe is void, and in the other it is filled with liquid sodium. Calculations are made with two different Los Alamos Monte Carlo codes: the continuous-energy code MCNP and the multigroup code MCMG. (ERA citation 05:024057)

LAL-78-17 MF **A01**
Paris-11 Univ., Orsay (France). Lab. de l'Accelerateur Lineaire.
Systematic Measurement of Electron Drift Velocity and Study of Some Properties of Four Gas Mixtures: A-CH Sub 4 , A-C sub 2 H sub 4 , A-C sub 2 H sub 6 , A-C sub 3 H sub 8.
B. Jean-Marie, V. Lepeltier, and D. L'Hote. Jun 78, 21p
U.S. Sales Only. Microfiche copies only.

Systematic measurements of the electron drift velocity have been made for four argon-hydrocarbon vapor mixtures; argon-methane, argon-ethylene, argon-ethane, argon-propane; and values of the electric field ranging from 0.3 to 4 kV/cm. The results are analyzed in terms of stability and 'saturation' of the drift speed. The effects of the electron diffusion are also investigated. (Atomindex citation 11:503445)

PAT-APPL-6-036 257 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Glove Box Shield.
Patent Application,
L. W. Brackenbush, and G. R. Hoenes. Filed 4 May 79, 12p
Contract EY-76-C-06-1830
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A shield for a glove box housing radioactive material is comprised of spaced apart clamping members which maintain three overlapping flaps in place therebetween. There is a central flap and two side flaps, the side flaps overlapping at the interior edges thereof and the central flap extending past the intersection of the side flaps in order to insure that the shield is always closed when the user withdraws his hand from the glove box. Lead loaded neoprene rubber is the preferred material for the three flaps, the extent of lead loading depending upon the radiation levels within the glove box. (ERA citation 05:029444)

PNL-SA-6521 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Analysis of Freight Train Accident Statistics for 1972-1974.
E. S. Murphy. May 78, 8p CONF-780506-42
Contract EY-76-C-06-1830
Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 May 1978.

Both train speed and dollar damage have been used in transportation studies as measures of accident severity. Analysis of freight train accident data for the three year period, 1972-74 showed that, in general, as speed increases dollar damage to railroad property also increases. A greater percentage of high speed than low speed accidents result in high dollar damage. Factors, in addition to speed, that can have an important effect on accident severity include the type of accident, the kinds of railcars and other equipment involved, and the geographical environmental of the accident. Threshold levels of accident stresses (e.g., impact and puncture forces and fire temperature and duration) are required to compromise the integrity of shipping containers used for the transport of radioactive materials. Analyses of accident severity using either speed or dollar damage as a basis can provide some insights into the possible risks involved in transport of radioactive materials. however, care must be taken in the strict use of results since there is no direct correlation between either speed or dollar damage and cask failure threshold levels. (ERA citation 05:009697)

PNL-2678 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Use of Benefit-Cost Analysis in Establishing Federal Radiation Protection Standards: A Review.
L. E. Erickson. Oct 79, 77p
Contract EY-76-C-06-1830

This paper complements other work which has evaluated the cost impacts of radiation standards on the nuclear industry. It focuses on the approaches to valuation of the health and safety benefits of radiation standards and the actual and appropriate processes of benefit-cost comparison. A brief historical review of the rationale(s) for the levels of radiation standards prior to 1970 is given. The Nuclear Regulatory Commission (NRC) established numerical design objectives for light water reactors (LWRs). The process of establishing these numerical design criteria below the radiation protection standards set in 10 CFR 20 is reviewed. EPA's 40 CFR 190 environmental standards for the uranium fuel cycle have lower values than NRC's radiation protection standards in 10 CFR 20. The task of allocating EPA's 40 CFR 190 standards to the various portions of the fuel cycle was left to the implementing agency, NRC. So whether or not EPA's standards for the uranium fuel cycle are more stringent for LWRs than NRC's numerical design objectives depends on how EPA's standards are implemented by NRC. In setting the numerical levels in Appendix I to 10 CFR 50 and 40 CFR 190 NRC and EPA, respectively, focused on the costs of compliance with various levels of radiation control. A major portion of the paper is devoted to a review and critique of the available methods for valuing health and safety benefits. All current approaches try to estimate a constant value of life and use this to vaue the expected number of lives saved. This paper argues that it is more appropriate to seek a value of a reduction in risks to health and life that varies with the extent of these risks. Additional research to do this is recommended. (ERA citation 05:009268)

PUC-TN-3/78 PC **A05**/MF **A01**
Pontificia Univ. Catolica do Rio de Janeiro (Brazil). Inst. de Fisica.
Selected K and L X-Ray Mass Attenuation Coefficients for Low Atomic Number Materials.
E. C. Montenegro, G. B. Baptista, and P. W. E. P. Duarte. Mar 78, 76p
U.S. Sales Only.

X-ray attenuation coefficients for low atomic mumbers elements were obtained for characteristic K and L X-ray of a number of selected elements using the fitting of a third degree polynomial to the values tabulated by Storm and Israel. (Atomindex citation 10:422661)

SGAE-2955 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Testing Facility for Large Scale Models at 100 Bar and 300 exp 0 C to 1000 exp 0 C.
H. Zemann. Jul 78, 16p RS-136/78
U.S. Sales Only.

A testing facility for large scale model tests is in construction under support of the Austrian Industry. It will contain a Prestressed Concrete Pressure Vessel (PCPV) with hot linear (300 exp 0 C at 100 bar), an electrical heating system (1.2 MW, 1000 exp 0 C), a gas supply system, and a cooling system for the testing space. The components themselves are models for advanced high temperature applications. The first main component which was tested successfully was the PCPV. Basic investigation of the building materials, improvements of concrete gauges, large scale model tests and measurements within the structural concrete and on the liner from the beginning of construction during the period of prestressing, the period of stabilization and the final pressurizing tests have been made. On the basis of these investigations a computer controlled safety surveillance system for long term high pressure, high temperature tests has been developed. (Atomindex citation 10:455580)

SLAC-PUB-2417 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Use of Elementary Particle Interactions for Radiological Imaging.
S. H. Williams, and D. W. G. S. Leith. 1979, 3p CONF-791037-8
Contract EY-76-C-03-0515
IEEE nuclear science symposium, San Francisco, CA, USA, 17 Oct 1979.

The potential for the use of inelastic high energy particle reactions to produce radiological images is parable to that of computerized axial tomography at a fraction of the radiation exposure. In addition, the comparison of coherently produced events to the total inelastic cross section should allow a probe of the chemical composition (i.e., average Z) of the material being studied. The performance of this technique is reviewed and some preliminary results using a 5 GeV/c pi exp - beam at SLAC are presented. (ERA citation 05:009471)

TGL-25294 PC **A02**/MF **A01**
Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German D.R.).
Sealed Radioactive Sources. Radioactive Materials. Classification and Test Methods.
Dec 77, 14p
In German.
U.S. Sales Only.

Prototype testing of sealed radiation sources is specified. Methods for assessing the short-time stability against temperature effects, external pressure, impact, vibration, and puncture are presented. A classification scheme is given for marking the sealed sources. Minimum requirements which have to be met by sealed sources are laid down for typical fields of application such as gamma radiography, medicine, control engineering, X-ray fluorescence analysis, nuclear well logging, calibration, irradiation, radiometric gages and ionization devices. (Atomindex citation 10:433198)

TID-28884(Dr) PC **A04**/MF **A01**
Interagency Review Group on Nuclear Waste Management, Washington, DC.
Interagency Review Group Report on Transportation Issues.
11 Sep 78, 52p

This subgroup examined the transportation system issues which must be considered in the development and implementation of a National nuclear waste management policy. Five basic issues were discussed: standards for packagings and containment systems for normal and accident conditions, institutional controls, additional measures required against malevolent acts, responsibility of the Federal government in case of accident, and adequate supply of hardware and vehicles for transporting nuclear wastes. Recommended actions are listed. (ERA citation 04:035887)

UNI-SA-68 PC **A02**/MF **A01**
Department of Energy, Richland, WA. Richland Operations Office.
Planning for Decommissioning of the Shippingport Atomic Power Station.
J. L. Landon, and R. L. Miller. 1979, 17p CONF-790923-4
Contract EY-76-C-06-1857
Decontamination and decommissioning of nuclear facilities conference, Sun Valley, ID, USA, 16 Sep 1979.

The overall objective of the project is to place Shippingport in a long term radiologically safe condition following termination of operations and to perform the decommissioning in such a manner so as to provide engineering, technology and cost in-

formation for future projects. The Decommissioning Assessment, Environmental Assessment, and a draft outline for the EIS have been completed. The results of the assessments are summarized. In addition, the management of the Shippingport decommissioning project is discussed. (ERA citation 05:000828)

UTNL-R-0060 PC **A05**/MF **A01**
Tokyo Univ. (Japan). Nuclear Engineering Research Lab.
Proceedings of a Meeting on Radiation Shielding and Related Topics. Present Status and Review of Shielding Studies.
1978, 94p CONF-780259-
In Japanese.Meeting on radiation shielding, Tokyo, Japan, 22 Feb 1978.
U.S. Sales Only.

This is a proceedings of a meeting on radiation shielding and related topics held on Feb. 22 and 23 in 1978 at Nuclear Engineering Research Laboratory of University of Tokyo. The reports includes the following items (1) studies on neutronics with accelerators (2) radiation damage (3) shielding design (4) radiation streaming (5) shielding experiments from a point of view of radiation measurements (6) shielding benchmark experiments (7) prospects on the study of neutronics. All items are written in Japanese. (Atomindex citation 09:410171)

18G. Radioactive Wastes and Fission Products

AED-Conf-77-470-003 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Present State of Knowledge Concerning the Nuclear Back-End-Cycle.
L. Finsterwalder. 1977, 16p CONF-7710151-2
In German.Conference on the problems of radioactive wastes in nuclear technology, Essen, F.R. Germany, 20 Oct 1977.
U.S. Sales Only.

Following a brief treatment of the fuel cycle, the nuclear fuel reprocessing according to the Chop-Leach-Purex method is explained more closely. By means of apparative equipment used in the reprocessing, the most important steps of nuclear disposal (intermediate storage, head-end, extraction, waste treatment) are described and the operational experiences so far of reprocessing plants - especially of WAK - is reproduced. (Atomindex citation 09:394545)

AED-Conf-77-473-004 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Experience with Filter Installations and Emissions from the Karlsruhe Reprocessing Plant (WAK).
G. Herrmann, H. W. Beaujean, and H. Huebner. 1977, 8p CONF-771139-9
In German.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

When irradiated nuclear fuels are reprocessed large quantities of liquid and solid aerosols are produced in addition to the volatile fission products. These are retained at various separation stages in the filters. An analysis of operating data and other additional measurements leads to certain conclusions regarding the retention of aerosols in scrubbers and filters. Knowledge is also gained on the formation of aerosols, which is of great importance when considering the optimum design for filtration installations. The paper also explains what effect such techniques as steam jets may have on releases from a reprocessing plant. 'Hot' operation of the Karlsruhe plant for the last six years shows that the aerosol filtration is effective. The paper reports on experience with the existing off-gas plant and reviews the improvements and extensions planned. (Atomindex citation 09:385825)

AED-Conf-77-473-005 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Operational Experience of Gaseous Effluents Treatment at the EUREX Pilot Plant.
H. Dworschak, G. Alonzo, G. Cestaro, G. B. Fasolo, and A. Hall. 1977, 14p CONF-771139-
Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

Description of the off-gas treatment systems; operational experience with krypton, iodine and aerosols; site receptivity and environmental radiation surveillance. (Atomindex citation 09:385822)

AED-Conf-77-473-008 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Processing and Monitoring Liquid, Radioactive Effluents from the Wiederaufarbeitungsanlage Karlsruhe.
G. Hoehlein, K. L. Huppert, and M. Winter. 1977, 20p CONF-771139-16
In German.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

The Wiederaufarbeitungsanlage Karlsruhe (WAK) serves as a demonstration plant for the processing of highly-irradiated uranous oxide. The high active waste concentrates find interim storage at the WAK until they are solidified at a later stage. In contrast to this, the slightly- and the medium-active liquid wastes are transported to the decontamination facility of the Nuclear Research Centre Karlsruhe, where they are immediately processed. These liquid wastes contain about 1 per thousand of the activity inventory of the fuel elements processed. Monitoring of the radioactive waste water of the WAK is carried out by the Nuclear Research Centre's department radiation protection and safety. (Atomindex citation 09:386873)

AED-Conf-77-473-011 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Exp 14 CO sub 2 Emissions from the WAK.
H. Schuettelkopf, and G. Herrmann. 1977, 14p CONF-771139-10
In German.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

For a realistic dose calculation of the exp 14 C population exposure in the neigbourhood of reprocessing plants, exp 14 CO sub 2 measurements have been carried out in the waste air from the WAK. 12.4+-0.3 and 13.7+-0.7 Ci exp 14 CO sub 2 /GWsub(e)sub(l)xa were measured as emission rates during the dissolution of PWR and BWR fuels. exp 14 CO sub 2 is released between fuel fragmentation and the end of the boiling process. Compared to the emission of exp 85 Kr, there is a delay of about 1 h. Without dissolution, the exp 14 CO sub 2 emission decreases exponentially with a half-life of about 3 weeks. The exposure in the neighborhood is negligible, due to the fact that the area most exposed to the waste air plume is unpopulated and is not used for food raising. The maximum exposure to be expected in the neighbourhood of a large processing plant will be about 1/3 of the natural exp 14 C exposure and 1/200 of the natural radiation exposure. It is guaranted that the demands made in the radiation protection ordinance will be observed at any time, so that exp 14 C emissions are negligible from the point of view of safety. (Atomindex citation 09:385833)

AED-Conf-77-473-015 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Evaluation of the Radiological Impact on the Environment from Normal Operation of Large Fuel Reprocessing Plants.
P. Handge. 1977, 22p CONF-771139-13
In German.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

The evaluation of the radiological impact on the environment resulting from a large spent-fuel reprocessing plant during normal operation does not differ from that of a nuclear power plant insofar as all released radionuclides, their dispersion in the environment, possible enrichment processes of the food pathways and their contribution to the radiological exposure of the general public and critical population groups have to be studied. Dispersion patterns of the liquid radioactive material released are dependent upon the nature of the recipient water body. If, therefore, the reprocessing plant should utilize a cooling pond, for recycling cooling water, the situation will differ from that using rivers or tidal waters. The radionuclide spectrum in the air discharged from a reprocessing plant is also different from that in the air discharged from a conventional nuclear power plant. The radionuclides requiring most attention are T, exp 14 C, exp 85 Kr, exp 106 Ru and exp 129 I. The considerations involved in dealing adequately with the radiological impact of these significant radionuclides within the frame of the newly launched licensing procedure for a large spent-fuel reprocessing plant will be discussed. (Atomindex citation 09:386279)

AED-Conf-77-473-019 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Reprocessing off-Gas Treatment Research in Belgium.
L. H. Baetsle, and J. Broothaerts. 1977, 23p CONF-771139-4
Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

The research project at the Belgian Nuclear Research Center (S.C.K./C.E.N.) is technologically oriented and aims at the development of industrially applicable techniques for capture of in the perspective of increasingly severe discharge authorizations at the stack of reprocessing plants. Attention was focussed on the I problem particularly, the long lived I exp 129 isotope. Among the many capture techniques, scrubbing by HgNO sub 3 -HNO sub 3 solutions, followed by adsorption on silver impregnated zeolites was chosen. Pilot installations with a throughput of 25 m exp 3 h exp -1 have been constructed and operated with simulated gases resulting fram a mock-up dissolver and traced with molecular I exp 131 and CH sub 3 I exp 131 at up to several hundred mCi. The second nuclide of interest to the environment is Kr exp 85 which has to be retained within the limits imposed by the new US regulations. Cryogenic absorption-distillation was chosen as reference technique. A pilot installation of 15 m exp 3 h exp -1 has been installed and operated on a continuous basis. Capture of T gas and tritiated water vapor was studied parametrically in simulated conditions. A new pilot equipment of 15 m exp 3 h exp -1 combining catalytic oxidation and adsorption on molecular sieves has been constructed. All the selected techniques will be integrated into a mock-up gas loop of 25 m exp 3 h exp -1 in order to test the mutual influence of the different unit steps on each other and on the ultimate decontamination factor. Finally a pilot facility for studying head-end processing (HERMES) has been designed in which the most appropriate gas purification techniques will be tested in hot cell conditions. (Atomindex citation 09:385817)

AED-Conf-77-473-023 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Aerosol and Iodine Removal in a Reprocessing Plant: Concept of the PASSAT Dissolver off Gas Section.
J. Furrer, K. Jannakos, and J. G. Wilhelm. 1977, 14p CONF-771139-8
In German.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

A new filter combination is presented and its remotely handled single components are described. The principle of design chosen for the filter elements provides for direct ultimate disposal in waste barrels of 200 l volume. The optimization of housings and filter units is studied in the simulated dissolver off gas of the PASSAT facility. Measurements made on aerosol filters for droplet and solid aerosols are indicated. It is reported about the aerosol and iodine behavior during and after dissolution of spent fuel in reprocessing plants as well

as about the removal efficiencies measured for aerosols and iodine. (Atomindex citation 09:385823)

AED-Conf-77-473-025 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
AZUR. A Plant for Purification of Dissolver off-Gas from WAK.
H. W. Beaujean, U. Tiliessen, G. Engelhardt, and G. Israel. 1977, 9p CONF-771139-6
In German.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

The construction of AZUR means a considerable contribution to the eventual licensing and construction of a corresponding plant for the German reprocessing and waste-disposal center; because, according to the recommendation given by the German Commission on Radiological Protection, not only aerosols and iodine, but also krypton is to be removed on a long-term basis from the dissolver off-gas. During operation of AZUR under the realistic, hot conditions of a reprocessing plant results are expected confirming the possibility of industrial realization as well as demonstrating the operational availability under all safety requirements. (Atomindex citation 09:385819)

AED-Conf-77-473-027 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Off-Gas Treatment in HTR Fuel Reprocessing.
H. Barnert-Wiemer, and E. Merz. 1977, 8p CONF-771139-5
In German.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

In the reprocessing of HTR fuel essentially all of the gaseous fission products are released during the head-end treatment, which includes burning of the graphite matrix and dissolving of the heavy metallic residues in THOREX reagent. Test facilities for off-gas cleaning have been developed. The burner off-gas consists mainly of CO sub 2 and with 0.5 ppm Kr and 10 exp -3 ppm T in the form of tritiated water. After a caralytic burning step to remove the CO, the off-gas is liquified and distilled. The Kr-rich distillate is transferred to gas cylinders for storage. The Kr-free bottom product contains the tritiated water which is absorbed on a molecular sieve before the CO sub 2 is released to the atmosphere. The dissolver off-gas consists mainly of air with 90 ppm Kr, 500 ppm Xe, 5 x 10 exp -2 ppm T as tritiated water and 1,500 ppm NOsub(x). The gas is dried and filtered before oxygen and NOsub(x) are reacted with H sub 2 in the presence of a catalyst to form N sub 2 and H sub 2 O. The gas (N sub 2 , Ar, Xe, Kr) then enters the cryogenic separation unit where Xe freezes out in cold traps and the remaining gas is liquified and distilled. The Kr-free distillate (N sub 2 , Ar) is released to the atmosphere, the Kr-rich bottom product is stored in gas cylinders. The frozen out Xe contains about 1% Kr. To gain pure Xe this mixture is also distilled. The status of the facility development and test results will be reported. (Atomindex citation 09:385818)

AED-Conf-77-473-031 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Trapping Kr-85 Discharged by Fuel Reprocessing Plants - a Cost Effectiveness Analysis.
F. Castellani, G. Curzio, and A. Gentili. 1977, 8p CONF-771139-7
In French.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

The problem of trapping the Kr-85 discharged by fuel processing facilities was studied from the point of view of cost effectiveness, taking account of the most generally accepted theories on: 1) the biological effects of ionising radiation at very low levels; 2) man-rem cost; 3) average dose to the world population from release into the atmosphere of all Kr-85 produced. Our investigation shows that trapping this product is justified - from the economic point of view - only if operational and depreciation costs for the separation and storage facilities do not exceed a few hundred thousand dollars per year per plant. This is of the same order as the indicated cost for the Morris plant (Ill., U.S.A.) where the cryogenic process is used. However, it must not be forgotten that the present situation and the operating experience gained to date do not constitute an adequate basis for final conclusions. (Atomindex citation 09:385821)

AED-Conf-77-473-032 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Monitoring the Release of Radioactivity from the Karlsruhe Reprocessing Plant (WAK).
V. Boehmer, G. Herrmann, and H. P. Wichmann. 1977, 12p CONF-771139-12
In German.Radioactive effluents from nuclear fuel reprocessing plants seminar, Karlsruhe, F.R. Germany, 22 Nov 1977.
U.S. Sales Only.

This report concerns installations for monitoring the release of gaseous and airborne radioactivity from the stack of the Karlsruhe plant. A simplified flow sheet of the off-gas and air extraction system is used to explain the continuous measuring equipment for determining releases of exp 85 Kr, exp 131 I, and the alpha and beta -active aerosols. Continuous sampling for measuring releases of exp 129 I, T, and exp 90 Sr is also described. The apparatus and measuring techniques and ranges of measurement are discussed. A quantitative analysis is made of the errors which occurred in the actual monitoring of exp 129 I, and of the effect of the individual errors on that of the overall result. Measured release rates for exp 129 I, exp 90 Sr and T are related to feed rates or to the operating stages on the flow sheet. This report also deals with the monitoring program for discharges of radioactivity in liquid effluents from the Karlsruhe plant and with results for total activity and for a number of single nuclides. (Atomindex citation 09:386270)

AED-Conf-77-498-029 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Present State of Reprocessing.
K. L. Huppert. 1977, 24p CONF-7709147-67
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The operation of several reprocessing plants - industrial size and pilot plants - has made it possible to build up substantial experience in the processing of irradiated fuels. More than 28,000 tons of fuels from gas-graphite reactors were processed on an industrial basis in Britain and France. For the treatment of both metallic fuels and high burn-up UO sub 2 -fuels, a solvent extraction process is applied which is based on the Purex process with a TBP kerosene mixture as extractant. A shear-leach technique is used for the break-down of the bundle elements and dissolution of the uranium oxide in nitric acid. Mechanically agitated extractors and pulsed columns have proved to be reliable equipment. The products are uranyl nitrate and plutonium nitrate. Process chemicals are recycled to minimize the volume of radioactive waste and precautions are taken to prevent uncontrolled escape of radioactivity. The technical status will be described as well as experience from pilot operation. (Atomindex citation 09:385826)

AERE-R-9445 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Environmental and Medical Sciences Div.
Radioactive Waste Disposal by UKAEA Establishments During 1978 and Associated Environmental Monitoring Results.
E. M. Flew. May 79, 24p
U.S. Sales Only.

This report gives details of the amounts of solid and liquid radioactive waste disposed of by the principal establishments of the UKAEA during 1978. Waste arising at the UKAEA Nuclear Power Development Laboratories at Windscale and Springfields, which are both situated on British Nuclear Fuels Ltd. (BNFL) sites, is disposed of by BNFL and included in their authorisations. Discharges to atmosphere of airborne radioactive waste are also included in the report. A summary of the results of the environmental monitoring programmes carried out in connection with the radioactive waste discharges is given. (Atomindex citation 11:497433)

CAEC-012 PC **A03**/MF **A01**
California Univ., Davis. Dept. of Mechanical Engineering.
Assessment of the Long-Term Storage of Zircaloy Fuel Rods in Water.
Z. A. Munir. 15 Oct 77, 28p

This report is a preliminary assessment of corrosion mechanisms which might affect the integrity of zircaloy-clad fuel rods during long periods of underwater storage. Potential corrosion mechanisms are discussed, and those which merit further investigation are identified. These are the principal recommendations. Current methods of degradation assessment of spent fuel are inadequate; other methods must also be used. The general corrosion of zircaloy under water storage is believed to be too low to justify concern over periods of 10 to 20 years. Additional experimental work is needed to establish the roles of the following variables on zircaloy corrosion: degree of residual stress; fission product uptake and the degree of prior embrittlement; galvanic coupling with other metals of the fuel rod storage assembly; and the nature and concentrations of surface layer contaminants accumulated during reactor residence. (ERA citation 04:054208)

EUR-5785 PC **A02**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Comparative Evaluation of Radioactive Materials Management by Different Methods: Pt. 1. Quantitative Comparison of the Different Methods Used for the Reduction of the Volume of alpha Contaminated Solid Wastes.
K. Ditterich, and J. Schneider. 1977, 22p
In German.
U.S. Sales Only.

In order to estimate the various strategies based on different system structures, a methodology is given. It is applied to the radioactive waste management systems. The base of the methodology is constituted of objective criteria to calculate the validity of the considered method. The validity of this method is demonstrated by application to the evaluation of processes for reducing the volume of Pu contaminated solid wastes. (Atomindex citation 10:456367)

IJS-106/5022-77 MF **A01**
Institut Jozef Stefan, Ljubljana (Yugoslavia).
Radiological Monitoring of Nuclear Facilities.
M. Mihailovic, M. Najzer, I. Kobal, W. Udovc, and D. Zovrtanik. 1977, 111p
In Slovenian.
U.S. Sales Only. Microfiche copies only.

We have continued to measure gross beta activity of the river Sava water samples near Krsko and Sentjakob and water samples of springs and wells near NEK, as well as quantitative and qualitative gamma spectroscopic isotopic analysis of agricultural products and river Sava water samples. We have found that the average gross beta activity of river Sava water samples near Krsko is lower about fifteen percent that the average activity of the previous years, while it stayed the same in Sentjakob (discounting one result in august, which was 12,8 pCi/l). In quantitative isotopic analysis we had problems due to low resolution of the NaI(Tl) crystal, so we were able to measure only K-40 with required accuracy. Improvement of equipment for gama spectrometry would be essential for continuation the quantitative isotopic analysis program. In the second part of the project we have processed four-year data from measurements of natural radioactivity of the environment. The conclusion was that the collected data give a good account of the following: a) fluctuations in natural beta activity of the river Sava, b) the contibution of soluble and insoluble natural or artificial radionuclides, c) gross alpha activity of the river Sava water samples, d) specific activity of the ash in the river water samples, e) gross beta activity of seston, sediments, bentos on various sampling locations, f) influence of the local sewage on the

concentration of the various elements in the samples of water, and water organisms, g) level of natural gross beta radioactivity in water springs and wells, h) gross beta activity of agricultural products. (Atomindex citation 10:430400)

INIS-mf-4915 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Situation on Regulatory Aspects of Underground Disposal of Radioactivity Wastes in Japan.
T. Murano, T. Asano, and N. Matsubara. 1978, 5p
U.S. Sales Only.

At present, in Japan, there exists no law specifically regulating the underground disposal of radioactive wastes although various regulations deal with disposal safety measures in a general way. For the moment, apart from the need to gain public acceptance of such disposal, the problem is essentially one of technical feasibility, and a geological study is currently being undertaken by the Science and Technology Agency. This same Agency is also looking at the problem of a long-term waste management system, but it is the Nuclear Safety Commission, created in 1978, which will be primarily responsible for all regulatory aspects of safety. (Atomindex citation 10:453061)

INIS-mf-4916 PC **A02**/MF **A01**
Atomic Energy Control Board, Ottawa (Ontario).
Regulation of Radioactive Waste Management in Canada.
1978, 22p
U.S. Sales Only.

Radioactive waste management facilities are subject to the Atomic Energy Control Regulations under jurisdiction of the Atomic Energy Control Board. Before such a facility can be constructed and permitted to operate, the applicant must obtain from the AECB in turn, site approval, a construction approval, and an operating licence, different considerations (e.g. geological, security) being given priority at each stage. Operating licences are normally valid for one year only, their renewal being dependent on observance, by the applicant, of the procedures and conditions laid down by the Board. Licensing document No.23 offers guidance on the requirements involved both generally and in relation to specific methods of waste storage and disposal. A copy of this document is attached to the present paper. (Atomindex citation 10:453074)

INIS-mf-5181 PC **A02**/MF **A01**
Kraftwerk Union A.G., Erlangen (Germany, F.R.).
Compact Storage of Spent Fuel Elements in Nuclear Power Plants with LWR Reactors.
Sep 78, 13p
In German.
U.S. Sales Only.

The storage of burnt fuel elements in NPPs is part of the principle design of such plants. The increasing of the storage capacity of the cooling ponds in the NPPs by replacing normal supports by compact supports is a measure which is technically realizable and represents a positive contribution to the total range of problems of waste management. The technical realisation of compact supports was demonstrated both by the theoretical works carried out up today and the practical carrying out of such compact supports. Furthermore, there are positive comments of experts on the compact supports. (Atomindex citation 10:477191)

JAERI-M-7619 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Ventilation System for exp 99 Mo Production Apparatus. Radioiodine Behavior and Removal Efficiency of Activated Charcoal Filter.
M. Izumo, S. Okane, T. Sorita, and S. Aoyama. Apr 78, 40p
In Japanese.
U.S. Sales Only.

In production of 20 Ci exp 99 Mo from exp 235 U fission, about 120 Ci of radioiodine (exp 131 I, exp 132 I, and exp 133 I) is involved. To remove airborne radioiodine from the exhaust air from production apparatus and minimize radioiodine release to the atmosphere, the ventilation system is equipped with 2 units of Model-FD charcoal filter (KI sub 3 -Impregnated charcoal 2 inch thick of Barnebey-Cheney Co.). From September 1976 to December 1977, 21 runs of exp 99 Mo production involving airborne radioiodine were carried out. The ventilation system was operated continuously for the whole 15 months period; variation in removal efficiency of airborne radioiodine from the exhaust air stream was observed. In the runs valuable experiences were gained in operation and maintenance of the ventilation system including activated charcoal filter and health-physics management of such facility. Following are the results: (1) Airborne radioiodine from exp 99 Mo production apparatus is reduced to 10 exp -3 % of the original quantity. (2) When the ventilation system is operated at a maximum air flow rate through the filter, the average efficiency during 15 months is over 98%. (3) Airborne radioiodine released from exp 99 Mo production apparatus to the ventilation system is less than 5% particulate iodine and alkyl iodines and more than 95% inorganic iodine. (4) Airborne radioiodine released from the stack is less than 28 mu Ci/run, which is below the limit in regulations on Radioisotope Production Laboratory. (Atomindex citation 10:430506)

JAERI-M-7857 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Radioactive Characteristics of Spent Fuels and Reprocessing Products in Thorium Fueled Alternative Cycles.
M. Maeda. Sep 78, 28p
U.S. Sales Only.

In order to provide one fundamental material for the evaluation of Th cycle, compositions of the spent fuels were calculated with the ORIGEN code on following fuel cycles: (1) PWR fueled with Th-enriched U, (2) PWR fueled with Th-denatured U, (3) CANDU fueled with Th-enriched U and (4) HTGR fueled with Th-enriched U. Using these data, product specifications on radioactivity for their reprocessing were calculated, based on a criterion that radioactivities due to foreign elements do not exceed those inherent in nuclear fuel elements, due to exp 232 U in bred U or exp 228 Th in recovered Th, respectively. Conclusions are as the following: (1) Because of very high contents of exp 232 U and exp 228 Th in the Th cycle fuels from water moderated reactors, especially from PWR, required decontamination factors for their reprocessing will be smaller by a factor of 10 exp 3 to 10 exp 4 , compared with those from U-Pu fueled LWR cycle. (2) These less stringent product specifications on the radioactivity of bred U and recovered Th will justify introduction of some low decontaminating process, with additional advantage of increased proliferation resistance. (3) Decontamination factors required for HTGR fuel will be 10 to 30 times higher than for the other fuels, because of less exp 232 U and exp 228 Th generation, and higher burn-up in the fuel. (Atomindex citation 10:471118)

KBS-TR-88 PC **A03**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Groundwater Chemistry at Depth in Granites and Gneisses.
G. Jacks. Apr 78, 40p
U.S. Sales Only.

The place considered for a radioactive waste storage is beneath a local water divide along the east-coast of southern and central Sweden. pH is fixed by the carbonate system and the ground waters can be expected to be saturated with respect to calcite. pH may vary from about 7,2 to about 8,5 with the most probable value around 8. The content of Cl exp - is difficult to asses as it is associated with the presence of relict sea water. Relict sea waters are linked to the postglacial clays and low sections of the terrain. Near local water divides the content of Cl exp - is low approaching the atmospheric contribution or below 10 mg/l. The content of F exp - is restricted by the solubility of fluorspar and may be about 7 mg/l as a maximum, but normally 3,5 mg/l or lower. SO sub 4- seems to be of the same order as the atmospheric contribution or about 15 mg/l. In the deep boreholes sampled so far the contents have been lower. The partial pressure of oxygen in the ground water should be very low. An increasing ironcontent towards depth is likely. Organic substance in the order of a few tenths of mg/l may be present. The local heating of the water close to the storage may bring about precipitation of calcite while the subsequent cooling when the water leaves the storage may result in precipitation of aluminiumsilicates. This may have a sealing effect of the rock. (Atomindex citation 10:431036)

KEK-78-21 PC **A03**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Radioactive Liquid Waste Treatment Plant in KEK.
C. Yamaguchi, and Y. Nishizaka. Nov 78, 35p
U.S. Sales Only.

The outline and flow diagram of the low level (<10 exp -5 mu Ci/cm exp 3) radioactive liquid waste treatment plant in the National Laboratory for High Energy Physics are presented. The detailed description of the individual facilities or equipments is given. The decontamination factors (DF) for the flocculation system and evaporation-condensation system have been obtained experimentally using stable Sr(NO sub 3) sub 2 . (Atomindex citation 11:497425)

KFK-2842 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik.
Material Investigations on Solidification of Intermediate-Level Waste Solutions in Cement: Leachability of Strontium and Cesium.
G. Rudolph, and R. Koester. Aug 79, 38p PWA-18/79
In German.
U.S. Sales Only.

Investigations are reported on reducing cesium and strontium leachability from products formed at the cementation of intermediatelevel waste solutions from reprocessing plants. The leach tests used were the IAEA method and an accelerated test. One particular natural calcium bentonit lowers the cesium leaching by a factor up to 100, depending on the amount added. Strontium leaching is decreased, to a lesser extent, by addition of a barium silicate hydrate; this effect is found mainly at elevated temperatures. Leaching in a salt brine in equilibrium with carnallite and other salts is significantly lower than in distilled water. Excess cesium enhances cesium leaching. Other parameters such as type of cement, setting time, water reducing agents, salt content, have little, if any, effect. Tests on bleeding of cement grouts containing simulated waste solution showed an unfavorable behavior of blast furnace slag cement. (Atomindex citation 11:497424)

KURRI-TR-161 PC **A03**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Deposition and Washout of Windborne Material from Radioactive Wastes Incinerator.
T. Tsutsui, and T. Tsukatani. 24 Oct 77, 41p
In Japanese.
U.S. Sales Only.

Deposition rate of windborne material emitted from the sources of heights from 0 to 200 meters was calculated under the conditions of dry and wet depositions including the washout effect by rain for each atmospheric stability. Chamberlain's deposition equation was modified to consider the effect of rain washout as well as wet deposition. The results showed an extremely clear effect of rain washout especially within 10 km of travel distance where the height of sources has little significance on the rates of deposition and washout. Hence, it is important for the evaluation of environmental assessment to consider the rainy condition. Radioactive wastes incinerator exhausts the size distributed particles even after the treatment of polluted gas. An example of the dry deposition was shown for the case of size distributed particles. (Atomindex citation 10:427465)

LA-UR-80-1168 MF **A01**
Los Alamos Scientific Lab., NM.
Plutonium Recovery at the Los Alamos Scientific Laboratory.
E. L. Christensen. Jun 80, 27p CONF-800611-5
Contract W-7405-ENG-36
International symposium on the management of alpha-contaminated wastes, Vienna, Austria, 2 Jun 1980, Portions of document are illegible.

Microfiche copies only.

Research programs have led to the adoption of procedures for all phases of plutonium recovery and purification. This report discusses some of the many procedures required to recover and purify the plutonium contained in the residues generated by LASL research, process development, and production activities. The report also discusses general plant facilities, the liquid and gaseous effluents, and solid waste management practices at the New Plutonium Facility, TA-55. Many of the processes or operations are merely steps in preparing the feed for one of the purification systems. For example, the plutonium is currently removed from noncombustibles in the pickling operation with an HNO sub 3 leach. The HNO sub 3 leach solution is the product of this operation and is sent to one of the nitrate anion-exchange systems for concentration and purification. (ERA citation 05:023720)

LA-8177 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Environmental Sampling Program for a Solar Evaporation Pond for Liquid Radioactive Wastes.
R. Romero, T. C. Gunderson, and A. D. Talley.
Apr 80, 10p
Contract W-7405-ENG-36

Los Alamos Scientific Laboratory (LASL) is evaluating solar evaporation as a method for disposal of liquid radioactive wastes. This report describes a sampling program designed to monitor possible escape of radioactivity to the environment from a solar evaporation pond prototype constructed at LASL. Background radioactivity levels at the pond site were determined from soil and vegetation analyses before construction. When the pond is operative, the sampling program will qualitatively and quantitatively detect the transport of radioactivity to the soil, air, and vegetation in the vicinity. Possible correlation of meteorological data with sampling results is being investigated and measures to control export of radioactivity by biological vectors are being assessed. (ERA citation 05:023729)

NP-23919 PC **A03**/MF **A01**
California Energy Resources Conservation and Development Commission, Sacramento.
Status of Nuclear Fuel Reprocessing, Spent Fuel Storage, and High-Level Waste Disposal. Overview and Summary.
E. E. Varanini, III, and R. L. Maullin. 11 Jan 78, 43p

With regard to the specific question embodied in California's nuclear statutes about the demonstrated and approved permanent terminal disposal of nuclear waste (assuming that the reprocessing question is now most for legislative purposes), the finding of the Energy Commission is that such a technology has not been demonstrated and that it is even questionable to assume that one will be demonstrated before the mid 1980s. Following upon this finding and addressing the broader question of continued implementation of the policy expressed by the nuclear fuel cycle statutes, the evidence indicates that it is not prudent to continue siting nuclear powerplants based on an optimistic assumption that waste management technologies to handle nuclear waste will be developed and scientifically demonstrated. The California Legislature has questioned that optimistic assumption by placing the burden of proof on the developers of a demonstrated, scientifically tested process for the permanent and terminal disposal of nuclear wastes. Such a process does not exist at this time. There are many who are optimistic that the development of such a technology will become a reality in the near future. This overview and the supporting report indicate that this optimism is not warranted. Weapons proliferation and degradation of the biosphere by radioactive waste have proved to be unanticipated, difficult and possibly intractable problems in spite of an overriding confidence that nuclear technology would not present such problems. On the basis of the evidence received by this Commission, there are substantial scientific gaps which preclude proceeding on the basis of faith that all the attendant risks and issues will be resolved. (ERA citation 04:056115)

NUREG/CR-1260 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Evaluation of Docket Files for Terminated Special Nuclear Material Licenses,
C. F. Holoway, P. M. Lantz, and H. W. Dickson.
Jun 80, 54p ORNL/NUREG/TM-352
Contract W-7405-eng-26

In 1976, the General Accounting Office (GAO) requested the Nuclear Regulatory Commission (NRC) to provide assurance that no radiological health or safety problems exist at sites previously operated under licenses issued by the NRC or its predecessor, the Atomic Energy Commission (AEC). A random sampling of the files by GAO had indicated that documentation was lacking or inadequate, in some cases, to demonstrate that terminated licenses had been accompanied by adequate decontamination and/or radiological evaluation to verify that the sites could be returned to the public domain for unrestricted use. The purpose of the present study is to effect a screening and categorization of those special nuclear material (SNM) docket files which have been terminated. Special nuclear material is defined in Part 70 of the Code of Federal Regulations (CRF) as plutonium, (233)U, uranium enriched in the isotope (233)U, or in (235)U, and any other material deemed to be special nuclear material, but excluding 'source material.' Evaluation of Part 70 docket files has been done to determine which, if any, of the sites represented by those files may be a potential radiological health hazard.

NUREG/CR-1262 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Risk Methodology for Geologic Disposal of Radioactive Waste: A Distribution-Free Approach to Inducing Rank Correlation Among Input Variables for Simulation Studies,
Ronald L. Iman, and W. J. Conover. Jul 80, 25p
SAND-80-0157
Prepared in cooperation with Texas Tech Univ., Lubbock. Coll. of Business Administration.

A method for inducing a desired rank correlation matrix on a multivariate input random variable is introduced in this paper. This method is simple to use, is distribution free, preserves the exact form of the marginal distributions on the input variables, and may be used with any type of sampling scheme for which correlation of input variables is a meaningful concept. A small simulation study provides an estimate of the bias and variability involved in the method. Input variables used in a model for study of geologic disposal of radioactive waste provide an example of the usefulness of this procedure.

NUREG/CR-1289 PC **A13**/MF **A01**
Brookhaven National Lab., Upton, NY.
Evaluation of Isotope Migration-Land Burial: Water Chemistry at Commercially Operated Low-level Radioactive Waste Disposal Sites.
Status rept.,
Allen J. Weiss, Peter Colombo, James H. Clinton, Sandra L. Garber, and Kenneth S. Czyscinski. Jul 80, 288p BNL/NUREG-51143
Contract DE-AC02-76CH00016

In cooperation with the U.S. Geological Survey, a field and laboratory program was initiated to study the existing commercial low-level radioactive waste disposal sites. This investigation will provide source term data for radionuclides and other solutes in trench waters at the sites and will describe the physical, chemical, and biological properties of the geochemical system that control the movement of radionuclides. This study was also initiated to provide experimental research support to the U.S. Nuclear Regulatory Commission for development of criteria for the selection and licensing of solid low-level radioactive waste disposal sites. The disposal sites sampled to date are located at West Valley, New York; Maxey Flats, Kentucky; Barnwell, South Carolina; and Sheffield, Illinois. Procedures for the collection, preparation and analysis (particularly under anaerobic conditions) of trench waters were developed, when necessary, to supplement standard procedures. Inorganic, organic, and radiochemical constituents in trench waters are measured and their relevance to movement of radionuclides is being evaluated.

PAT-APPL-6-003 840 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Material for Radioactive Protection.
Patent Application,
R. S. Taylor, and N. W. Boyer. Filed 16 Jan 79, 13p
Contract W-31-109-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A boron containing burn resistant, low-level radiation protection material useful, for example, as a liner for radioactive waste disposal and storage, a component for neutron absorber, and a shield for a neutron source is described. The material is basically composed of borax in the range of 25 to 50%, coal tar in the range of 25 to 37.5%, with the remainder being an epoxy resin mix. A preferred composition is 50% borax, 25% coal tar and 25% epoxy resin. The material is not susceptible to burning and is about 1/5 the cost of existing radiation protection material utilized in similar applications. (ERA citation 05:028486)

PAT-APPL-6-043 855 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Method of Handling Radioactive Alkali Metal Waste.
Patent Application,
R. D. Wolson, and C. C. McPheeters. Filed 30 May 80, 21p
Contract W-31-109-ENG-38
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Radioactive alkali metal is mixed with particulate silica in a rotary drum reactor in which the alkali metal is converted to the monoxide during rotation of the reactor to produce particulate silica coated with the alkali metal monoxide suitable as a feed material to make a glass for storing radioactive material. Silica particles, the majority of which pass through a 95 mesh screen or preferably through a 200 mesh screen, are employed in this process, and the preferred weight ratio of silica to alkali metal is 7 to 1 in order to produce a feed material for the final glass product having a silica to alkali metal monoxide ratio of about 5 to 1. (ERA citation 05:028466)

PAT-APPL-6-058 420 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Electric Controlled Air Incinerator for Radioactive Wastes.
Patent Application,
J. H. Warren, and H. E. Hootman. Filed 18 Jul 79, 15p
Contract AT(07-2)-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A two-stage incinerator is provided which includes a primary combustion chamber and an afterburner chamber for offgases. The latter is formed by a plurality of vertical tubes in combination with associated manifolds which connect the tubes together to form a continuous tortuous path. Electrically-controlled heaters surround the tubes while electrically controlled plate heaters heat the manifolds. A gravity-type ash removal system is located at the bottom of the first afterburner tube while an air mixer is disposed in that same tube just above the outlet from the primary chamber. A ram injector in combination with rotary magazine feeds waste to a horizontal tube forming the primary combustion chamber. (ERA citation 05:028467)

PNCT-841-78-69 MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Studies on the Dispersion of Low-Level Liquid Effluent Released from the Fuel Reprocessing Plant into the Sea.
K. Iwasaki, S. Fukuda, A. Hirayama, Y. Kitahara, and Y. Kishimoto. Dec 78, 127p
In Japanese.
U.S. Sales Only. Microfiche copies only.

The low level liquid waste effluent has been released batchwise into the Pacific Ocean from the fuel reprocessing plant of PNC sited in Tokai-mura since September 1977. The liquid effluent is discharged from the nozzle located about sixteen meters below the sea surface and dispersed by ambient cross stream. Gross beta activity, tritium and exp 137 Cs concentrations in seawater were

measured from November 1972 to June 1973 in accordance with a special monitoring program to examine the dilution and dispersion of effluent in seawater. The results of tritium measurement showed that the effluent was diluted by two or three orders of magnitude by jet mixing immediately after the discharge from the nozzle, and was further diluted by one or two orders of magnitude by traveling several hundred meters along the current. It was observed that the areal concentration of tritium in surface water raised temporarily after the discharge of more than several tens curies, but returned to the background level within a day or so. No significant increase in concentration of gross beta activity and exp 137 Cs activities in seawater was observed in this period. (Atomindex citation 11:497440)

PNL-SA-7875 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Numerical Analysis of Radionuclide Movement from a Hypothetical Nuclear Waste Repository.
J. R. Raymond, and G. Segol. 1979, 27p
Contract EY-76-C-06-1830

A numerical analysis of the consequences of radionuclide release from a hypothetical nuclear waste repository located in bedded salt and of their subsequent transport by ground water has been performed. The study was based on available geologic and hydrologic information for the reference location. The initial run was based on a best estimate of geologic and hydrologic parameters for this reference location. Its results indicate that those isotopes which reach the natural discharge point remain below MPC levels for uncontrolled water use. The initial run was followed by a parametric study to evaluate the sensitivity of the model to the values of input parameters. This analysis shows that the model is sensitive to the assumed values of hydraulic conductivity, dispersivity and retardation factor, as expected. But this analysis also emphasizes that there exist complex interactions between such parameters which are less intuitively evident. The influence of waste leach rates is being investigated. (ERA citation 05:005473)

PNL-SA-7897 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Mathematical Simulation for Safety Assessment of Nuclear Waste Repositories.
A. Brandstetter, J. R. Raymond, and G. L. Benson. 1979, 24p CONF-790994-1
Contract EY-76-C-06-1830
26. Pacific Northwest regional meeting of the American Geophysical Union, Bend, OR, USA, 17 Sep 1979.

Mathematical models are being developed as part of the Waste Isolation Safety Assessment Program (WISAP) for assessing the post-closure safety of nuclear waste storage in geologic formations. The objective of this program is to develop the methods and data necessary to determine potential events that might disrupt the integrity of a waste repository and provide pathways for radionuclides to reach the bioshpere, primarily through groundwater transport. Four categories of mathematical models are being developed to assist in the analysis of potential release scenarios and consequences: (1) release scenario analysis models; (2) groundwater flow models; (3) contaminant transport models; and (4) radiation dose models. The development of the release scenario models is in a preliminary stage; the last three categories of models are fully operational. The release scenario models determine the bounds of potential future hydrogeologic changes, including potentially disruptive events. The groundwater flow and contaminant transport models compute the flowpaths, travel times, and concentrations of radionuclides that might migrate from a repository in the event of a breach and potentially reach the biosphere. The dose models compute the radiation doses to future populations. Reference site analyses are in progress to test the models for application to different geologies, including salt domes, bedded salt, and basalt. (ERA citation 05:005457)

PNL-2652 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Waste Isolation Safety Assessment Program. A Brief Description of the Three-Dimensional Finite Element Ground-Water Flow Model Adapted for Waste Isolation Safety Assessments.
C. R. Cole, and S. K. Gupta. Aug 79, 57p
Contract EY-76-C-06-1830

Four levels of hydrologic models have been categorized to handle varying complexities and degrees of available input parameters. The first level is for the simplest one-dimensional models having analytical solutions; the second level includes idealized analytic or hybrid analytic models for single aquifer systems with scanty input data; the third level deals with more complex single or quasi-multilayered systems; and the fourth level is for complex multilayered systems. The three-dimensional finite element ground-water model described in this report falls under the fourth level of hydrologic models. This model is capable of simulating single-layered systems having variable thickness or multilayered systems where not only thickness can be varied, but the number of layers can be changed to agree with the vertical geologic section. Supporting programs have been developed to plot grid values, contour maps and three-dimensional graphics of the input data used in simulation as well as the results obtained. At present, the model considers only confined aquifers. The capabilities of the model were demonstrated by using a test case consisting of the multilayered ground-water system beneath Long Island, New York. (ERA citation 05:002671)

PNL-2821 PC **A11**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Effects of the Ben Franklin Dam on the Hanford Site.
H. Harty. Apr 79, 230p
Contract EY-76-C-06-1830

A previous assessment of the effects of a Ben Franklin Dam on the Hanford Site made in 1967 was updated so that the potential adverse effects may be better understood in light of existing operations, current environmental and safety standards, and proposed facilities and operations. The major effects would probably arise from flooding of portions of the site by the reservoir associated with the dam and by the raising of the ground water table under the site. A preliminary analysis of the effects of the dam is presented, and a number of studies are recommended in order to fully evaluate and understand these potential impacts. The following seven tasks are identified and discussed: groundwater - hydrology analysis; soil liquefaction analysis; hydrostatic uplift and soil effects on structures; assessment of the potential for landsliding and sloughing; facility decommissioning; hydrothermal analysis; and, meteorological effects. Four other aspects commented upon in this report are: aquatic ecology, terrestrial ecology, socioeconomic effects, and public interaction. Possible effects on ongoing DOE-sponsored R and D are also noted. To the extent possible, cost estimates are developed for corrective actions which must be taken on the Hanford Site to accommodate the dam. Where this was not possible, appropriate courses of action leading to cost estimates are presented. (ERA citation 04:055534)

PNL-2925 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
In-Can Melting Process and Equipment Development from 1974 to 1978.
H. T. Blair. Aug 79, 160p
Contract EY-76-C-06-1830

Both the defense HLLW stores in tanks presently and the HLLW from proposed reprocessing of commercial LWR fuel can be vitrified as borosilicate glass in containers made of 300-series stainless steel by the ICM (in-can melting) process. Melting rates of 50 kg/h in 12-in.-dia cans and 117 kg/h in 28-in.-dia cans can be achieved in the ICM by using the rising-level charging method and internal heat-transfer plate assemblies in the cans. The ICM process can be monitored and remotely controlled without the aid of instrumentation attached to the waste can. The ICM process is compatible with both heated-wall spray calciners and fluidized-bed calciners. The ICM process causes residual tensile stresses as high as the yield strength in vitrified product containers made of 300-series stainless steel. Spall due to oxidation of the exterior of the can during an ICM process can be prevented by using an inert cover gas, by putting a protective coating on the can surface, or by using an oxidation-resistant alloy. Processing problems are minimized and product quality is improved when the complete can is located inside the furnace chamber by setting it on the hearth. A maximum of 24 kW and an average of 15 kW is required per 15-in.-high furnace zone to melt waste borosilicate glass at a rate of 117 kg/h in a 28-in.-dia ICM. (ERA citation 05:005446)

PNL-2982 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Spent LWR Fuel Leach Tests: Waste Isolation Safety Assessment Program.
Y. B. Katayama. Apr 79, 50p
Contract EY-76-C-06-1830

Spent light-water-reactor (LWR) fuels with burnups of 54.5, 28 and 9 MWd/kgU were leach-tested in deionized water at 25 exp 0 C. Fuel burnup has no apparent effect on the calculated leach rates based upon the behavior of exp 137 Cs and exp 239 + 240 Pu. A leach test of 54.5 MWd/kgU spent fuel in synthetic sea brine showed that the cesium-based leach rate is lower in sea brine than in deionized water. A rise in the leach rate was observed after approximately 600 d of cumulative leaching. During the rise, the leach rate for all the measured radionuclides become nearly equal. Evidence suggests that exposure of new surfaces to the leachant may cause the increase. As a result, experimental work to study leaching mechanisms of spent fuel has been initiated. 22 figures. (ERA citation 05:005432)

PNL-2999(Pts.1-4) PC **A07**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Research and Development Activities: High-Level Waste Immobilization Program. Quarterly Progress Reports, January-December 1978.
J. L. McElroy, J. E. Mendel, W. F. Bonner, and M. H. Henry. May 79, 142p
Contract EY-76-C-06-1830

This document contains the four quarterly reports for 1978. Accomplishments of each quarter are described separately. Emphasis is on the glass route of solidification. (ERA citation 05:000269)

PNL-3094 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
High-Level Waste Immobilization Program: An Overview.
W. R. Bonner. Sep 79, 46p
Contract EY-76-C-06-1830

The High-Level Waste Immobilization Program is providing technology to allow safe, affordable immobilization and disposal of nuclear waste. Waste forms and processes are being developed on a schedule consistent with national needs for immobilization of high-level wastes stored at Savannah River, Hanford, Idaho National Engineering Laboratory, and West Valley, New York. This technology is directly applicable to high-level wastes from potential reprocessing of spent nuclear fuel. The program is removing one more obstacle previously seen as a potential restriction on the use and further development of nuclear power, and is thus meeting a critical technological need within the national objective of energy independence. (ERA citation 05:006558)

PNL-3181 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Characterization of Gaseous and Particulate Effluents from the Nuclear Vitrification Project.
R. W. Goles, D. C. Hamilton, F. P. Brauer, H. G. Rieck, Jr., and D. M. Robertson. Oct 79, 39p
Contract EY-76-C-06-1830

Samples were taken during the second high-level liquid waste vitrification campaign associated with the NWVP. Sample analysis established the following total average emission levels in the undiluted vitrification off-gas stream: exp 3 H - 1.2 mu Ci/m exp 3 , exp 14 C - 0.2 mu Ci/m exp 3 , exp 129 I - 1 nCi/m exp 3 , NO/sub x/ - 0.5%, exp 99 Tc - 1.6 pCi/m exp 3 , and gamma -emitters - 10 exp 5 (gamma /s)/m exp 3 . The aerosol size distribution is composed almost entirely of particles exhibiting

smaller diameters than the minimum value for which absolute filters are rated, with an empirical geometric mean diameter of 0.13 mu m and a particle mass concentration of 84.7 pg/cm exp 3 . The particulate matter was composed of exp 106 Ru, exp 125 Sb, /sup 125m/Te, exp 134 Cs, exp 137 Cs, exp 144 Ce, exp 154 exp 155 Eu and exp 241 Am. The particulate emission levels in the undiluted process off-gas stream were: exp 106 Ru - 44 nCi/m exp 3 , exp 125 Sb - 0.52 nCi/m exp 3 , /sup 125m/Te - 1.7 nCi/m exp 3 , exp 134 Cs - 7.8 nCi/m exp 3 , exp 137 Cs - 52 nCi/m exp 3 , exp 144 Ce - 0.8 mu Ci/m exp 3 , exp 154 Eu - 0.3 nCi/m exp 3 , exp 155 Eu - 0.18 nCi/m exp 3 , and exp 241 Am - 0.19 nCi/m exp 3 . All these environmental gaseous and airborne emissions level liquid waste were well within PNL waste management guidelines. (ERA citation 05:005447)

PNL-3186 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Technical Requirements for the Control of exp 129 I in a Nuclear Fuels Reprocessing Plant.
L. L. Burger, and R. E. Burns. Nov 79, 34p
Contract EY-76-C-06-1830

A proposed regulation would limit the release of exp 129 I to the environment to 0.005 Ci/GWe-yr of nuclear power produced. This corresponds to an overall exp 129 I retention factor of about 250 for the LWR fuel cycle. Technolgies available and under development for removing iodine from off-gas and waste water streams in an LWR nuclear fuel reprocessing plant and for converting iodine to stable forms and retaining it for interim and long-term storage, transportation and isolation are discussed. Possible developments are reviewed. Technologies available for retaining iodine from off-gas and excess water streams appear adequate, when properly combined, to meet the proposed regulation in an LWR fuel reprocessing plant, though additional work on solid sorbents is needed. Demonstrations under plant conditions are needed to define and resolve problems not met in laboratory experiments and to define practical operating conditions. Criteria for storage and disposal forms for retained iodine are needed to guide effective development of such forms. Because no disposal form for exp 129 I is likely to survive in any environment for even one half-life (1.6 x 10 exp 7 yr), work on a disposal form should seek forms that disintegrate as slowly as possible to maximize dilution before the isotope reaches the biosphere. (ERA citation 05:006560)

RFP-2798 PC **A02**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Waste Management Analysis for the Nuclear Fuel Cycle: Actinide Recovery from Combustible Waste, October 1977-March 1978.
G. H. Thompson, C. M. Smith, E. L. Childs, and R. L. Kochen. 18 Sep 79, 12p
Contract EY-76-C-04-3533

Evaluation of the Ce(IV)-NHO sub 3 system for recovery of actinides from incinerator ash is continuing. High-fired americium-traced plutonium oxide was completely solubilized in this system and recovery of actinides from incinerator ash was greater than or equal to 95%. Recovery of solubilized plutonium was done by solvent extraction using tributyl phosphate. Tervalent actinides will be recovered by a bidentate organophosphorus solvent extractant. The Ce(IV)-HNO sub 3 system was compared with the F exp - -HNO sub 3 system now in common use. Advantages of the former include less equipment corrosion, no volatilization of silica, and better recovery of actinide in the initial contact. However, additional contacts do not significantly improve recovery (because silica is not solubilized), and the system requires a large liquid/solid ratio for efficient actinide recovery. (ERA citation 05:000270)

RFP-2907 PC **A02**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Actinide Recovery from Combustible Waste: The Ce(IV)-NHO Sub 3 System. Final Report.
G. H. Thompson, E. L. Childs, R. L. Kochen, R. H. Schmunk, and C. M. Smith. 14 Sep 79, 22p
Contract EY-76-C-04-3533

Actinides in ash can be leached effectively by refluxing with Ce(IV) in HNO sub 3 ; solubilization of actinide in ash was greater than or equal to 95% at ash concentrations to 30 g/l in stirred leachant. Plutonium and americium were the actinides present in the ash. Solubilized plutonium and americium were recovered from Ce(IV)-HNO sub 3 solution by solvent extraction. Extraction of plutonium into 30% tributyl phosphate in n-dodecane gave 99.99% recovery. The plutonium-depleted solution was then extracted with 30% dihexyl-N,N-diethylcarbamolylmethylenephosphonate (DHDECMP). Americium recovery was 99.64%. The Ce(IV)-HNO sub 3 system was compared with the HF-HNO sub 3 system now in common use. Advantages of the former included less equipment corrosion, no volatilization of silica, safe oxidation of carbon residues, minimal secondary waste (Ce is recycled), and better solubilization of actinide in the initial contact. However, additional contacts do not significantly improve solubilization, and a small fraction of actinide is not solubilized with Ce(IV)-HNO sub 3 that can be solubilized by HF-HNO sub 3 . The effect of the fission product ruthenium on the dissolution of actinides in the Ce(IV)-HNO sub 3 system was investigated briefly, and a method for removing the ruthenium electrolytically was developed. Several process flowsheets were also considered. Actinide recovery requirements will suggest which of these might best be used. 6 figures, 7 tables. (ERA citation 05:000271)

RHO-BWI-C-54 PC **A05**/MF **A01**
Colorado School of Mines, Golden. Evacuation Engineering and Earth Mechanics Inst.
Determination of Basalt Physical and Thermal Properties at Varying Temperatures, Pressures, and Moisture Contents. Second Progress Report, Fiscal Year 1979.
R. J. Miller. 13 Aug 79, 80p
Contract EY-77-C-06-1030

The rock mechanics testing performed at the Earth Mechanics Institute of the Colorado School of Mines for Rockwell Hanford Operations under Subcontract SA-917 is summarized. Cores were supplied from drill hole DC-8 on the Hanford Site, characterized geologically, and tested for thermal and physical properties for designing long-term underground storage of radioactive waste materials. This report presents the approved test procedures, results, and data analysis for this test series. Results indicate significantly lower strengths for drill hole DC-8 than determined for drill hole DC-6 or for the drill holes reported on in our fiscal year 1978 (FY 78) tests. Trends, however, were found to be similar between drill holes DC-6 and DC-8, and it is hoped more definitive conclusions can be found following completion of the final series of tests. (ERA citation 05:006262)

RHO-BWI-C-55 PC **A05**/MF **A01**
Colorado School of Mines, Golden. Evacuation Engineering and Earth Mechanics Inst.
Determination of Basalt Physical and Thermal Properties at Varying Temperatures, Pressures, and Moisture Contents. Third Progress Report, Fiscal Year 1979.
R. J. Miller. 31 Aug 79, 82p
Contract EY-77-C-06-1030

The rock mechanics testing performed at the Earth Mechanics Institute of the Colorado School of Mines for Rockwell Hanford Operations under subcontract SA-917 is summarized. Cores were supplied from drill hole DC-4 on the Hanford Site, characterized geologically, and tested for thermal and physical properties for designing long-term underground storage of radioactive waste materials. The approved test procedures, results, and data analysis for this test series are presented. Uniaxial and triaxial results indicate strengths similar to drill hole DC-6, but significantly higher than drill hole DC-8. Trends with density, depth, confining pressure, and temperature, however, were similar for the three drill hole locations tested. (ERA citation 05:006263)

RHO-BWI-CD-22(Rev.1) PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Preconceptual Design Management Plan Basalt Waste Isolation Program Basalt Repository.
J. F. Marron. 10 Nov 78, 25p
Contract EY-77-C-06-1030

The repository in Columbia Plateau basalt will receive nuclear waste in canisters (spent fuel, HLW, and ILW) and drums (low-level waste). This document establishes the management plan for the preconceptual design of the basalt repository. (ERA citation 05:006574)

RHO-BWI-79-100-2Q PC **A03**/MF **A01**
Rockwell International Corp., Richland, WA. Rockwell Hanford Operations.
Basalt Waste Isolation Program. Quarterly Report, January 1, 1979--March 31, 1979.
R. A. Deju. Apr 79, 49p
Contract EY-77-C-06-1030

During the quarter, progress was made in all areas of the Basalt Waste Isolation Program. In the Geosciences, Hydrology, and Engineered Barriers areas, work continued on schedule aimed at being able to make a site selection decision in 1981, as scheduled. Emphasis continued to be placed on geologic mapping studies, on hydrologic data gathering, and on definitions of waste/basalt interactions and needed engineered barriers. Construction of the Near-Surface Test Facility was rescheduled to reflect tunnel design changes and previous quarter work delays. Progress at the end of the quarter was approximately on schedule and the rate of work was accelerating to better than scheduled due to some equipment improvements and tunnel design modifications. In the Engineering Testing area, design work, test planning, and fabrication of heaters and auxiliary equipment continued on schedule. In the Repository area, an Architect/Engineer Evaluation Board was formally designated by the US Department of Energy-Headquarters during October 1978. The evaluation board will select an architect/engineer for repository conceptual design with an option for follow-on Title I, Title II, and Title III engineering services. Selection will be completed by October 1979. Questionnaire information was received from a number of interested architect/engineer firms by the US Department of Energy-Richland Operations Office and has been evaluated. Onsite visits with the qualified firms are scheduled during April 1979. In addition, repository preconceptual design studies continued on schedule with emphasis on compilation of repository functional design criteria by July 1979, and the repository preconceptual design report in August 1979. Twenty-nine documents were issued during the quarter. These documents are listed at the end of this report. (ERA citation 04:052690)

RHO-BWI-79-100-3Q PC **A04**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Basalt Waste Isolation Program. Quarterly Report, April 1, 1979-June 30, 1979.
R. A. Deju. Jul 79, 51p
Contract EY-77-C-06-1030

During the quarter, progress was made in all areas of the Basalt Waste Isolation Program. In the Geosciences, Hydrology, and Engineered Barriers areas, work continued on schedule aimed at being able to make a site selection decision in 1981, as scheduled. Emphasis continued to be placed on geologic mapping studies, on hydrologic data gathering, and on definition of waste/basalt interactions and needed engineered barriers. Progress at the end of the quarter on the Near-Surface Test Facility was approximately on schedule and the rate of work was accelerating to better than scheduled due to some equipment improvements and tunnel design modifications. In the Engineering Testing area, design work, test planning, and fabrication of heaters and auxiliary equipment continued on schedule. In the Repository area, an Architect/Engineer Evaluation Board was formally designed by the US Department of Energy-Headquarters during October 1978. The evaluation board will select an architect/engineer for repository conceptual design with an option for follow-on Title I, Title II, and Title III engineering services. Selection will be completed by October 1979. Questionnaire information was received from a number of interested architect/engineer firms by the US Department of Energy-Richland Operations Office and has been evaluated. Onsite visits with the qualified firms were completed during April 1979. In addition, repository preconceptual design stud-

ies continued on schedule with emphasis on compilation of repository functional design criteria by July 1979, and the repository preconceptual design report in September 1979. (ERA citation 05:008170)

RHO-C-25(V.2)(Dr) PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Dry Well Storage Facility Conceptual Design Study: Environmental Assessment. Report No. 79-8-R.
Feb 79, 37p
Contracts EY-77-C-06-1030, EY-76-C-06-219

The Dry Well Storage Facility will receive canisters (packages) containing spent fuel assemblies from a Spent Fuel Receiving and Packaging Facility or a Packaged Fuel Transfer Facility and store them in dry wells. The reference site for this study will be adjacent to the 200-W Area at the Hanford Reservation on a plateau approximately six miles from the Columbia River. This report discusses the potential nonradiological and radiological impacts on the environment due to construction, operation, and decommissioning of the facility. (ERA citation 05:005434)

RHO-CD-883 MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Nuclear Fuel Services Waste Characterization and Waste Removal System.
R. E. Smith. Apr 80, 56p
Contract AC06-77RL01030
Microfiche copies only.

The work covered by this DOE program is the key to providing necessary technical support to evaluate safety of continued in-tank storage and alternatives for final disposition of wastes at West Valley. The program has been scheduled to be performed as soon as feasibie, consistent with budget requirements for accuracy and safety. (ERA citation 05:023714)

RHO-LD-78-24-1Q PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Summary of Radioactive Solid Waste Burials in the 200 Areas During the First Quarter of 1978.
J. D. Anderson, and B. E. Poremba. 22 May 78, 42p
Contract EY-77-C-06-1030

This document is issued quarterly for the purpose of summarizing the amount of radioactive materials that have been buried in the burial grounds. In addition to data for 1978, cumulative data since plant startup are presented. Also in this document is a listing of decayed activity to the various plant burial sites. (ERA citation 04:049564)

RHO-LD-78-24-2Q PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Summary of Radioactive Solid Waste Burials in the 200 Areas During the First Half of 1978.
J. D. Anderson, and B. E. Poremba. 28 Aug 78, 41p
Contract EY-77-C-06-1030

In addition to date for 1978, cumulative data since plant startup are presented. Also in this document is a listing of decayed activity to the various plant burial sites. (ERA citation 04:048217)

RHO-LD-78-24-4Q PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Summary of Radioactive Solid Waste Burials in the 200 Areas During 1978.
J. D. Anderson, and B. E. Poremba. 12 Mar 79, 48p
Contract EY-77-C-06-1030

In addition to data for 1978, cumulative data since plant startup is presented. Also in this document is a listing of decayed activity to the various plant burials sites. (ERA citation 04:048219)

RHO-LD-79-3A PC **A07**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.

Process Technology and Process Development. Rockwell Hanford Operations Semiannual Report, October 1978-March 1979.
Aug 79, 144p
Contract EY-77-C-06-1030

This semiannual report provides information on the technical progress of process technology and process development activities being performed by Research and Engineering, Rockwell Hanford Operations to improve the processing of irradiated reactor fuels, the production of plutonium, and the management of resultant chemical wastes. The work reported herein was performed during the period October 1978 through March 1979. (ERA citation 05:002580)

RHO-SA-116 PC **A02**/MF **A01**
Rockwell International Corp., Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Rapid Petrographic Differentiation of the Major Crystalline Components of Synthetic Hanford Evaporator Slurry.
J. L. Starr. May 79, 7p CONF-790666-6
Contract EY-77-C-06-1030
34. Northwest regional meeting of the American Chemical Society, Richland, WA, USA, 13 Jun 1979.

The four major crystalline components of these synthetic slurry samples were shown to be differentiable by examining their morphology, habits, and interference figures. Since morphology and habit are plainly visible under crossed Nichols and a full wave plate, and since observation of interference figures may be accomplished at the push of a button; differentiation between each of the major crystalline phases present in this system was performed rapidly while observing those same crystals microscopically. Finally, crystal growth was shown to be dramatically affected by the presence of complexants. (ERA citation 05:008151)

RHO-SA-131 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Transuranic Distribution Beneath a Retired Underground Disposal Facility, Hanford Site.
R. B. Kasper, S. M. Price, M. K. Addition, R. M. Smith, and G. V. Last. Nov 79, 24p CONF-791103-62
Contract EY-77-C-06-1030
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

Past liquid waste disposal practices at the Hanford Site included the discharge of solutions containing low-level concentrations of transuranics directly to the ground via structures collectively termed cribs. A study was conducted to determine the present spatial distribution of plutonium and americium beneath the retired 216-Z-1A Crib, which contains one of the highest cumulative plutonium inventories, 57 kilograms. Sixteen shallow wells were drilled in the unsaturated sediments underlying the facility using specialized, totally contained drilling techniques. Samples from each well were analyzed to obtain profiles of both sediment type and plutonium and americium concentrations as a function of depth beneath the facility. The results of the study show that the highest concentration of plutonium (>10 exp 4 nCi/g of sediment) occurs within the first 3 meters of sediment beneath the central distribution pipe. The high activity at this position is tentatively attributed to the removal of solid particles from the waste stream by sediment filtration. The distributions of plutonium and americium in the sediments are similar. Peak transuranic activity in the sediment profile is generally associated with silt lenses or with major sedimentary unit interfaces (ie, sand to gravel). The maximum vertical extent of transuranic activity found is approximately 30 meters below the bottom of the crib or approximately 25 meters above the regional water table. No contamination greater than the instrumental limit of detection of 10 exp -5 nCi/g of sediment was found from a depth of 30 to 40 meters, the maximum depth of sampling. (ERA citation 05:006578)

RHO-SA-143 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.

Real-Time Monitoring of Hanford Nuclear Waste.
S. G. McNeece, J. A. Glasscock, and C. K. Rosnick. Oct 79, 19p
Contract EY-77-C-06-1030

Two minicomputers are used to perform real time monitoring of radioactive waste storage tanks on the Hanford Nuclear Reservation. The Computer Automated Surveillance System, CASS, consists of a network of six field microprocessors, a central microprocessor and two central Eclipse minicomputers. The field microprocessors are each responsible for monitoring alarm sensors, liquid levels and temperatures. The field microprocessors report alarm conditions immediately to the central microprocessor. The central minicomputer reports all alarm conditions to the user terminals, requests data from the field on a scheduled and requested basis, and generates reports. It handles all requests for information from the user and stores all incoming data for historical purposes. The CASS software consists of five major segments: (1) process creation, (2) report generation, (3) file updating, (4) terminal communication, and (5) microprocessor communication. Since CASS must operate 24 hours a day, 7 days a week, the system cannot be allowed to abnormally terminate. For this reason all processes are started by the creation process. Having a single process responsible for creating all other processes provides the ability to detect a failure of a subordinate process and to automatically restart the failed process. The report generation process schedules reports, requests the data to be gathered to produce the reports, forms the reports, and distributes the reports to the user terminals. The file updating process handles all data file modifications. There is a terminal communication process for each user terminal which is responsible for printing scheduled reports and for allowing the user to request information from the CASS system. The microprocessor communication process handles all communication with the central microprocessor. (ERA citation 05:002638)

RHO-SA-155 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Energy Systems Group.
Sorption Studies at Hanford for the Control of Radioactive Wastes.
R. C. Routson, G. S. Barney, and R. M. Smith. Jan 80, 15p CONF-800607-31
Contract EY-77-C-06-1030
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Since 1944, the Hanford Site has been a location for the storage and disposal of radioactive wastes, nuclear reactor operations, and the chemical separations of nuclear materials. These activities resulted in the storage and disposal of fission products and low-level transuranic (TRU) radioactive wastes in the near future sediments above the water table. With the scale-down of Hanford reactor operations and fuel separation activities after 1967, increased emphasis was placed on waste management activities. Assessment of future impact of past Hanford operations required the development and verification of transport sorption models to make such assessments. Present Hanford sorption models and current studies for the sorption of strontium, cesium, and cobalt on the sediments of the Hanford Separation Areas based on a waste property/areal site-specific measurement concept are discussed. (ERA citation 05:023740)

SAND-79-0117 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Gas Generation from Transuranic Waste Degradation: An Interim Assessment.
M. A. Molecke. Oct 79, 53p
Contract EY-76-C-04-0789

A review of all available, applicable data pertaining to gas generation from the degradation of transuranic waste matrix material and packaging is presented. Waste forms are representative of existing defense-related TRU wastes and include cellulosics, plastics, rubbers, concrete, process sludges, and mild steel. Degradation mechanisms studied were radiolysis, thermal, bacterial, and chemical corrosion. Gas generation rates are presented in terms of moles of gas produced per year per drum,

and in G(gas) values for radiolytic degradation. Comparison of generation rates is made, as is a discussion of potential short- and long-term concerns. Techniques for reducing gas generation rates are discussed. 6 figures, 10 tables. (ERA citation 05:002599)

SAND-79-0172 PC **E04**/MF **E04**
Sandia Labs., Albuquerque, NM.
Defense High-Level Waste and Spent Fuel Characterization for Geologic Waste Repositories.
S. H. Sutherland, and D. E. Bennett. Sep 79, 32p
Contract EY-76-C-04-0789

Results of SANDIA-ORIGEN calculations are given for the total thermal output and radionuclide content, up to 100,000 years decay time, for defense high-level waste expected from the Savannah River Plant, the Hanford Reservation and the Idaho National Engineering Laboratory, and for one pressurized water reactor and five boiling water reactor spent fuel types. These results are expected to be of value in evaluating the potential for storing defense high-level waste and/or spent fuel in geologic waste repositories. (ERA citation 05:004076)

SAND-79-0264(V.2) PC **A99**/MF **A01**
Sandia Labs., Albuquerque, NM.
Seismic Reflection Data Report: Waste Isolation Pilot Plant (WIPP) Site, Southeastern New Mexico.
J. L. Hern, D. W. Powers, and L. J. Barrows. Dec 78, 601p
Contract EY-76-C-04-0789

Volume II contains uninterpreted processed lines and shotpoint maps from three seismic reflection surveys conducted from 1976 through 1978 by Sandia Laboratories to support investigations for the Waste Isolation Pilot Plant. Data interpretations will be the subject of subsequent reports. (ERA citation 04:046002)

SAND-79-0273 PC **A04**/MF **A01**
Geological Survey, Albuquerque, NM.
Basic Data Report for Drillhole WIPP 13 (Waste Isolation Pilot Plant - WIPP).
Oct 79, 75p
Contract EY-76-C-04-0789

The borehole WIPP-13 was drilled in the SW 1/4 section 17, T22S, R31E of eastern Eddy County during July and August, 1978, to investigate the nature of a resistivity anomaly. The stratigraphic section was normal, consisting of 13 feet of Quaternary deposits (including artificial fill for drill pad), 53 feet of the Triassic Santa Rosa Sandstone, 451 feet of Dewey Lake Red Beds, 269 feet of the Rustler Formation and 179 feet of the upper member of the Salado Formation. Consecutive cores were taken from 570 to 595, 656 to 729, and 827 to 878 feet. Cuttings were collected at 10-foot intervals throughout the rest of the hole. Geophysical logs were run to aid in interpretation of the stratigraphy. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic (TRU) defense wastes. Eventual conversion of the facility to a repository for TRU defense wastes is anticipated. The WIPP will also provide research facilities for interactions between high-level waste and salt. (ERA citation 05:006579)

SAND-79-0278 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Basic Data Report for Drillhole WIPP 22 (Waste Isolation Pilot Plant, WIPP).
Mar 80, 72p
Contract AC04-76DP00789

WIPP 22 is an exploratory borehole whose objective is to determine the nature of the near-surface formations after seismic information indicated a possible fault. The borehole is located in section 20, T.22S., R.31E., in eastern Eddy County, New Mexico, and was drilled between March 14 and 30, 1978. The hole was drilled to a depth of 1448 feet and encountered, from top to bottom, surficial Holocene deposits (6', including artificial fill for drill pad), the Mescalero caliche (7'), the Santa Rosa Sandstone (68'), the Dewey Lake Red Beds (492'), the Rustler Formation (311'), and the upper portion of the Salado Formation (565'). Cuttings were collected at 10-foot intervals. A suite of geophysical logs was run to measure acoustic velocities, density, and radioactivity. On the basis of comparison with other geologic sections drilled in the area, the WIPP 22 section is a normal stratigraphic sequence and it does not show structural disruption. The WIPP is to demonstrate (through limited operations) disposal technology for transuranic defense wastes. The WIPP will also provide facilities to research interactions between high-level waste and salt. (ERA citation 05:023741)

SAND-79-0281 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
Basic Data Report for Drillhole WIPP 27 (Waste Isolation Pilot Plant).
Oct 79, 84p
Contract EY-76-C-04-0789

WIPP 27 was drilled in Eddy County, New Mexico (NM 1/4 sec. 21, T21S, R30E) to investigate evaporite dissolution features and to determine the stratigraphy of surface and near-surface formations. The borehole encountered, from top to bottom, 79 feet of Quaternary deposits, 73 feet of the Rustler Formation, and 171 feet of the upper portion of the Salado Formation. Consecutive cores were obtained for the entire depth of WIPP 27. Geophysical logs measure acoustic velocities, density, radioactivity, and formation resistivity. An interpretive report on dissolution in Nash Draw will be based on combined borehole data, surface mapping and laboratory analyses of Nash Draw rocks and fluids. (ERA citation 05:008171)

SAND-79-0895C MF **A01**
Sandia Labs., Albuquerque, NM.
Probabilistic Aspects of Faulting in Anisotropic Media.
R. M. Cranwell, and F. A. Donath. 1979, 8p CONF-791112-6
Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.
Microfiche copies only.

The potential is estimated for new faults occurring and intersecting a radwaste repository. In-situ stress measurements and seismic activity records are needed. (ERA citation 05:002640)

SAND-79-0896C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Sensitivity Studies of the Swift Radionuclide Transport Model.
J. E. Campbell, B. S. Langkopf, and R. L. Iman. 1979, 1p CONF-791112-22
Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

There are large uncertainties in the input waste depository. The aim of the sensitivity studies was to identify these uncertainties and to reduce the number of SWIFT transport calculations. The sensitivity analysis was applied to a hypothetical problem consisting of both a reference site containing a nuclear waste depository and a disruptive-event scenario for the possible release of radioactive materials to the biosphere. Results are presented for the total radionuclide discharge to a river in the 10 exp 6 -year time period following depository closure. (ERA citation 05:008176)

SAND-79-0900C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Brine Chemistry Effects on the Durability of a Simulated Nuclear Waste Glass.
J. W. Braithwaite. 1979, 8p CONF-791112-16
Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

The effects of various solution chemistry parameters on the alteration and leaching characteristics of a copper borosilicate simulated waste glass have been determined under hydrothermal conditions. Results are presented which demonstrate that leachant salinity, volume/glass surface area ratio, pH, cation content, and dissolved SiO sub 2 concentration effects are important. A brief explanation of these results is given which is based on ion exchange and solution saturation equilibria. (ERA citation 05:002672)

SAND-79-0907C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Geologic Waste Disposal and a Model for the Surface Movement of Radionuclides.
J. Helton, R. Iman, J. Brown, and S. Schreurs. 1979, 8p CONF-791112-18
Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

A model for the surface movement of radionuclides is presented. This model, which is referred to as the Pathways Model, was constructed in a NRC project to develop a methodology to assess the risk associated with the geologic disposal of high-level radioactive waste. The methodology development involves work in two major areas: (a) models for physical processes, and (b) statistical techniques for the use and assessment of these models. The presentation of the Pathways Model involves topics from both areas. (ERA citation 05:008172)

SAND-79-0955C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Development of Scenarios for Long-Term Release of Radionuclides from the Proposed Waste Isolation Pilot Plant in Southeastern New Mexico.
F. W. Bingham, and G. E. Barr. 1979, 7p CONF-791112-7
Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

As fault-tree analysis had its faults, the WIPP group switched its attention to the construction of event trees and of scenarios from the cut sets of these event trees. The scenarios were grouped into three classes for computer modeling: those that expose waste directly to the biosphere, those that begin with water flow between two aquifers at the site, and those that begin with water flow from only one aquifer. Each of the scenarios can be modeled by one of four general models. The current analyses of the long-term effects of the WIPP repository are derived from these models. Predicted doses from these hypothetical releases fall far below those from natural background radiation. (ERA citation 05:000303)

SAND-79-0981C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Tracer Tests Performed in the Field for WIPP in Southeastern New Mexico.
D. D. Gonzalez, and L. R. Hill. 1979, 3p CONF-791112-19
Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

A two-well recirculating tracer test began in October, 1979, to define as accurately as possible the hydraulic character of a fractured carbonate aquifer, the Culebra dolomite member of the Rustler Formation at the WIPP site in Eddy and Lee Counties, New Mexico. The Culebra dolomite overlies a zone planned for isolation of transuranic contaminated waste generated by the United States defense programs. The storage zone of the proposed facility is in nearly pure halite and about 1400 feet (427 meters) below the Culebra dolomite, the most likely pathway for the migration of radionuclides to the biosphere in the event the repository is breached by groundwater. Included in the definition of the hydraulic character of the Culebra aquifer are natural groundwater velocities, aquifer porosity and components of dispersivity. The proposed tracer test using sodium benzoate, a homologous series of chlorofluoromethanes and pentafluorobenzoic acid as tracers is described. Results of the test will be reported at a later date. (ERA citation 05:004077)

SAND-79-1016C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Radionuclide Transport in a Dolomite Aquifer.
R. G. Dosch, and A. W. Lynch. 1979, 8p CONF-791112-15

Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

The most probable paths for radionuclide transport between the biosphere and the proposed bedded salt repository (WIPP) in Southeastern New Mexico are through dolomite formations which are the only currently water-bearing units overlying the repository horizon. This paper describes some of the experimental work performed to determine the potential for radionuclide migration in these formations. Included are the results of radionuclide sorption studies on natural dolomites (Magenta and Culebra) and on synthetic dolomite (protodolomite). Sorption on natural dolomites was evaluated with respect to core sample location, groundwater composition, nuclide concentration, and water volume to rock mass ratios used in making the measurements. Results show that a discrete value such as a distribution coefficient (Kd) assigned to a given radionuclide does not accurately describe its interactions with site-specific geological formation. (ERA citation 05:002673)

SAND-79-1047C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Mechanical Modeling of Nuclear Waste Disposal in Argillite at the Nevada Test Site.
R. K. Thomas, and A. R. Lappin. 1979, 4p
CONF-791112-3
Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

Numerical calculations for a near surface heater experiment in argillite conducted at the Nevada Test Site were performed using the finite element code ADINA assuming a two-dimensional axisymmetric geometry. The existence and extent of the region of tensional opening of joints surrounding the heater, predicted by the mechanical model, were confirmed by posttest borehole inspection, permeability measurements, and drillback. Exrapolation of near surface heater model to repository depths reveals the necessity for prior knowledge of the mechanical properties and state of stress in-situ. The extent of the joint opening zone, for example, is not altered by changes in the elastic modulus at the near surface, but is significantly decreased beyond certain depths depending upon the in-situ elastic modulus. Results of these calculations are presented. To further define the behavior at depth, and place bounds on the joint opening zone, far-field calculations were performed for a generic repository in argillite. Both spent fuel and high level waste heat sources were considered at different burial densities and depths. Results of a parametric study are presented in which the mechanical properties, in-situ stresses, and waste heat sources were varied. (ERA citation 05:000290)

SAND-79-1197C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Sensitivity Study on the Parameters of the Regional Hydrology Model for the Nevada Nuclear Waste Storage Investigations.
R. L. Iman, J. M. Davenport, R. K. Waddell, H. P. Stephens, and D. I. Leap. 1979, 31p CONF-791016-3
Contract EY-76-C-04-0789
1979 DOE statistical symposium, Gatlinburg, TN, USA, 24 Oct 1979.

Statistical methodology has been applied to the investigation of the regional hydrologic systems of a large area encompassing the Nevada Test Site (NTS) as a part of the overall evaluation of the NTS for deep geologic disposal of nuclear waste. Statistical techniques including Latin hypercube sampling were used to perform a sensitivity analysis on a two-dimensional finite-element code of 16 geohydrologic zones used to model the regional ground-water flow system. The Latin hypercube sample has been modified to include correlations between corresponding variables from zone to zone. From the results of sensitivity analysis it was found that: (1) the ranking of the relative importance of input variables between locations within the same geohydrologic zone were similar, but not identical; and (2) inclusion of a correlation structure for input variables had a significant effect on the ranking of their relative importance. The significance of these results is discussed with respect to the hydrology of the region. (ERA citation 05:002642)

SAND-79-1278 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Pretest Thermal Analysis of the Tuff Water Migration/In-Situ Heater Experiment.
B. M. Bulmer. Feb 80, 43p
Contract AC04-76DP00789

This report describes the pretest thermal analysis for the Tuff Water Migration/In-Situ Heater Experiment to be conducted in welded tuff in G-tunnel, Nevada Test Site. The parametric thermal modeling considers variable boiling temperature, tuff thermal conductivity, tuff emissivity, and heater operating power. For nominal tuff properties, some near field boiling is predicted for realistic operating power. However, the extent of boiling will be strongly determined by the ambient (100% water saturated) rock thermal conductivity. In addition, the thermal response of the heater and of the tuff within the dry-out zone (i.e., bounded by boiling isotherm) is dependent on the temperature variation of rock conductivity as well as the extent of induced boiling. (ERA citation 05:023742)

SAND-79-1306 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Test Plan: Potash Core Test. WIPP Experimental Program Borehole Plugging.
C. L. Christensen. Sep 79, 40p
Contract EY-76-C-04-0789

The Potash Core Test will utilize a WIPP emplaced plug to obtain samples of an in-situ cured plug of known mix constituents for bench scale testing. An earlier effort involved recovery at the salt horizon of Plug 217, a 17 year old plug in a potash exploration hole for bond testing, but the lack of particulars in the emplacement precluded significant determination of plug performance. (ERA citation 05:000292)

SAND-79-1634C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Field Test Programs of Borehole Plugs in Southeastern New Mexico.
C. L. Christensen. Oct 79, 10p CONF-791033-1, ONWI/Sub-79-E-511-03700
Contract EY-76-C-04-0789
Annual ONWI information meeting, Columbus, OH, USA, 30 Oct 1979.

This paper presents the status of the Borehole Plugging Program underway for the plugging of drill holes on and near the proposed Waste Isolation Pilot Plant (WIPP) in southeastern New Mexico. This program will provide the technology for plugging wellbores when required at repository decommissioning. (ERA citation 05:000294)

SAND-79-1886C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Transportation of Radioactive Wastes from Nuclear Fuel Cycles.
Sep 79, 35p CONF-790957-1
Contract EY-76-C-04-0789
International nuclear fuel cycle evaluation conference, Vienna, Austria, 17 Sep 1979.

This paper discusses current and foreseen radioactive waste transportation systems as they apply to the INFCE Working Group 7 study. The types of wastes considered include spent fuel, which is treated as a waste in once-through fuel cycles; high-, medium-, and low-level waste; and gaseous waste. Regulatory classification of waste quantities and containers applicable to these classifications are discussed. Radioactive wastes are presently being transported in a safe and satisfactory manner. None of the INFCE candidate fuel cycles pose any extraordinary problems to future radioactive waste transportation and such transportation will not constitute a decisive factor in the choice of a preferred fuel cycle. (ERA citation 05:000252)

SAND-79-2019C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Calculated Hydrogeologic Pressures and Temperatures Resulting from Radioactive Waste in the Eleana Argillite.
R. R. Eaton, W. D. Sundberg, D. E. Larson, and M. P. Sherman. 1979, 9p CONF-791112-32
Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

The SHAFT 78 code (multi-dimensional, two fluid phases, porous medium) has been used to begin assessment of the consequences of nuclear waste burial in a 1000-acre repository emplaced in argillite. The repository is assumed to contain spent fuel (SF (UO_2)) at a loading of 150 kW/acre and to be located at a depth of 600 m. It was found that with perfect backfill, permeability = 1.0 x 10 exp -7 Darcys, a maximum fluid pressure in the repository of 770 bars existed at a time of 55 years after burial. Holding all other input variables constant, the maximum fluid pressure in the underground workings never exceeded the local lithostatic pressure when the permeability of the backfill material was increased to 1.0 x 10 exp -1 Darcys. The calculated temperature profiles are essentially independent of backfill permeability and porosity indicating that the heat flow is conduction dominated. (ERA citation 05:006582)

STUDSVIK-IP-78-3 PC **A03**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Reliability- and Safety Analysis of Activity Measuring Systems. 1. Reliability Analysis of the Stack Monitoring System 1317A.
M. Karell. May 78, 26p
In Swedish.
U.S. Sales Only.

The monitoring system at the Forsmark reactor in Sweden is examined. The analysis shows that the probability of an inhibited function within a reactors life-time (30y) is 0.0113, if the demand for alarm is taken to be 0.1/y. (Atomindex citation 10:430291)

TID-26904(Dr) PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Report of the Supgroup on Management of Spent Fuel from Commerical Power Reactors of the Interagency Review Group on Nuclear Waste Management.
11p

In October 1977, a new policy was announced by DOE, under which the U.S. Government would accept fuel for storage. This document discusses the current status of the policy implementation of the poilcy, including the GEIS, storage/disposal fee, AFR requirements and storage facilities. The schedule and work plan are discussed. Congressional activity is also covered. 3 tables, 1 figure. (ERA citation 04:029413)

UCID-18315 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
ARAC Feasibility Study for the NRC Phase I: Final Report.
L. C. Rosen, and R. C. Orphan. Nov 79, 56p
Contract W-7405-ENG-48

The feasibility of implementing ARAC (Atmospheric Release Advisory Capability) services in a particular nuclear power plant is examined. The criteria for selecting Rancho Seco are discussed and the physical, meteorological and procedural factors related to the plant are assessed. The potential benefits and limitations of implementing ARAC at Rancho Seco are analyzed. The costs of employing the system at the nuclear power plant are given for alternative plans. A training and familiarization program is outlined. (ERA citation 05:005785)

UCID-18664 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Review of Geochemical Measurement Techniques for a Nuclear Waste Repository in Bedded Salt.
K. G. Knauss, and T. L. Steinborn. 22 May 80, 72p
Contract W-7405-ENG-48

A broad, general review is presented of geochemical measurement techniques that can provide data necessary for site selection and repository effectiveness assessment for a radioactive waste repository in bedded salt. The available measurement techniques are organized according to the parameter measured. The list of geochemical pa-

rameters include all those measurable geochemical properties of a sample whole values determine the geochemical characteristics or behavior of the system. For each technique, remarks are made pertaining to the operating principles of the measurement instrument and the purpose for which the technique is used. Attention is drawn to areas where further research and development are needed. (ERA citation 05:023748)

UCID-18665 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Remarks on the Assessment, Representation, Aggregation and Utilization of Expert Opinion.
T. L. Fine. Apr 80, 42p
Contract W-7405-ENG-48

This report considers the relevance of recent ideas in the foundations of probability to the rational use of expert opinion in the design of a nuclear waste repository, and the assessment of its performance. The main probability concepts introduce are those of modal (probably A), comparative (A is at least as probable as B) and interval-valued (the lower probability of A is P(A) and the upper probability of A is P(anti A)) probabilities. We then outline an approach first using comparative probability to model the resuls of binary elicitation of an expert's opinions concerning repository uncertainties and then employing interval-valued probability to represent comparative probability in a computationally convenient form. We further consider the issue of aggregating or amalgamating the responses of several experts, and we emphasize the need to preserve some measure of the disagreements among the experts. The resulting aggregated interval-valued representation of the responses concerning the uncertainties surrounding the performance of a nuclear waste repository design can then be used to numerically assess this performance in a manner parallel to that of utility theory. Utility theory is the basis for statistical decision theory. Our recommendations can only be tentative, and research is recommended to gain some working experience with the results of the proposed decision-making process in the repostory design context. (ERA citation 05:023749)

UCRL-15102 PC **A04**/MF **A01**
Pacifica Technology, Del Mar, CA.
Effects of Brine Migration on Waste Storage Systems. Final Report.
E. S. Gaffney, and R. E. Nickell. 15 May 79, 51p
Contract W-7405-ENG-48

Processes which can lead to mobilization of brine adjacent to spent fuel or nuclear waste canisters and some of the thermomechanical consequences have been investigated. Velocities as high as 4 x 10 exp -7 m s exp -1 (13 m y exp -1) are calculated at the salt/canister boundary. As much as 40 liters of pure NaCl brine could accumulate around each canister during a 10-year storage period. Accumulations of bittern brines would probably be less, in the range of 2 to 5 liters. With 0.5% water, NaCl brine accumulation over a 10-year storage cycle around a spent fuel canister producing 0.6 kW of heat is expected to be less than 1 liter for centimeter-size inclusions and less than 0.5 liter for millimeter-size inclusions. For bittern brines, about 25 years would be required to accumulate 0.4 liter. The most serious mechanical consequence of brine migration would be the increased mobility of the waste canister due to pressure solution. In pressure solution enhanced deformation, the existence of a thin film of fluid either between grains or between media (such as between a canister and the salt) provides a pathway by which the salt can be redistributed leading to a marked increase in strain rates in wet rock relative to dry rock. In salt, intergranular water will probably form discontinuous layers rather than films so that they would dominate pressure solution. A mathematical model of pressure solution indicates that pressure solution will not lead to appreciable canister motions except possibly in fine grained rocks (less than 10 exp -4 m). In fine grained salts, details of the contact surface between the canister and the salt bed may lead to large pressure solution motions. A numerical model indicates that heat transfer in the brine layer surrounding a spent fuel canister is not conduction dominated but has a significant convective component. (ERA citation 05:002674)

UCRL-15111 PC **A11**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Retrieval System for Emplaced Spent Unreprocessed Fuel (SURF) In Salt Bed Depository: Accident Event Analysis and Mechanical Failure Probabilities. Final Report.
G. Bhaskaran, and J. E. McCleery. Oct 79, 250p
Contract W-7405-ENG-48

This report provides support in developing an accident prediction event tree diagram, with an analysis of the baseline design concept for the retrieval of emplaced spent unreprocessed fuel (SURF) contained in a degraded Canister. The report contains an evaluation check list, accident logic diagrams, accident event tables, fault trees/event trees and discussions of failure probabilities for the following subsystems as potential contributors to a failure: (a) Canister extraction, including the core and ram units; (b) Canister transfer at the hoist area; and (c) Canister hoisting. This report is the second volume of a series. It continues and expands upon the report Retrieval System for Emplaced Spent Unreprocessed Fuel (SURF) in Salt Bed Depository: Baseline Concept Criteria Specifications and Mechanical Failure Probabilities. This report draws upon the baseline conceptual specifications contained in the first report. (ERA citation 05:005469)

UCRL-81147(Pt.2) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Leaching Characteristics of Actinides from Simulated Reactor Waste, Part 2.
H. C. Weed, D. G. Coles, D. J. Bradley, R. W. Mensing, and J. S. Schweiger. 5 Oct 79, 9p
CONF-791112-10(Pt.2)
Contract W-7405-ENG-48
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

Leach rates for exp 237 Np and exp 239 Pu are investigated with a single-pass leaching system. The factorial experimental design uses several combinations of solution composition and flow rate, and two temperatures, 25 and 75 exp 0 C. The 25 exp 0 C results are compared with those from a modified IAEA procedure. At 25 exp 0 C, leach rates decrease with time. Agreement between results from the single-pass and modified IAEA methods is fair with WIPP brine leachant, good with NaHCO sub 3 , and good with distilled H sub 2 O. Leach rates are approximately independent of flow rates at room temperature, but increase with flow rates at high temperature. Rates for exp 237 Np increase with temperature, but those for exp 239 Pu either decrease or do not change with temperature. 7 figures. (ERA citation 05:000304)

UCRL-83489 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Atmospheric Release Advisory Capability (ARAC) Response to the Three Mile Island Accident.
M. H. Dickerson, and P. H. Gudiksen. Oct 79, 5p
CONF-791037-3
Contract W-7405-ENG-48
IEEE nuclear science symposium, San Francisco, CA, USA, 17 Oct 1979.

This paper discusses the three general classes of support provided by the Atmospheric Release Advisory Capability (ARAC) and describes the role played by ARAC in support of DOE during the Three Mile Island accident in March and April of 1979. (ERA citation 05:003080)

USGS-OFR-79-1244 PC **A05**/MF **A01**
Geological Survey, Denver, CO.
Preliminary Report on the Geology and Geophysics of Drill Hole UE25a-1, Yucca Mountain, Nevada Test Site.
R. W. Spengler, D. C. Muller, and R. B. Livermore. 1979, 80p
Contract EW-78-I-08-1543

A subsurface geologic study in connection with the Nevada Nuclear Waste Storage Investigations has furnished detailed stratigraphic and structural information about tuffs underlying northeastern Yucca Mountain on the Nevada Test Site. Drill hole UE25a-1 penetrated thick sequences of nonwelded to densely welded ash-flow and bedded tuffs of Tertiary age. Stratigraphic units that were identified from the drill-hole data include the Tiva Canyon and Topopah Spring Members of the Paintbrush Tuff, tuffaceous beds of Calico Hills, and the Prow Pass and Bullfrog Members of the Crater Flat Tuff. Structural analysis of the core indicated densely welded zones to be highly fractured. Many fractures show near-vertical inclinations and are commonly coated with secondary silica, manganese and iron oxides, and calcite. Five fait zones were recognized, most of which occurred in the Topopah Spring Member. Shear fractures commonly show oblique-slip movement and some suggest a sizable component of lateral compression. Graphic logs are included that show the correlation of lithology, structural properties, and geophysical logs. Many rock units have characteristic log responses but highly fractured zones, occurring principally in the Tiva Canyon and Topopah Spring Members restricted log coverage to the lower half of the drill hole. (ERA citation 05:002643)

Y/OWI/SUB-77-22303/4 PC **A09**/MF **A01**
RE/SPEC, Inc., Rapid City, SD.
Thermoelastic Analyses of Spent Fuel Repositories in Bedded and Dome Salt. Technical Memorandum Report RSI-0054.
G. D. Callahan, and J. L. Ratigan. 13 Oct 78, 192p
Contract W-7405-ENG-26

Global thermoelastic analyses of bedded and dome salt models showed a slight preference for the bedded salt model through the range of thermal loading conditions. Spent fuel thermal loadings should be less than 75 kW/acre of the repository pending more accurate material modeling. One should first limit the study to one or two spent fuel thermal loading (i.e. 75 kW/acre and/or 50 kW/acre) analyses up to a maximum time of approximately 2000 years. Parametric thermoelastic type analyses could then be readily obtained to determine the influence of the thermomechanical properties. Recommendations for further study include parametric analyses, plasticity analyses, consideration of the material interfaces as joints, and possibly consideration of a global joint pattern (i.e. jointed at the same orientation everywhere) for the non-salt materials. Subsequently, the viscoelastic analyses could be performed. (ERA citation 05:006532)

18H. Radioactivity

AED-Conf-77-537-008 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Studies of Radioactivity in Closed Rooms with the Aid of Static Methods of Measurement.
U. Boesenberg. 1977, 6p CONF-7710173-5
In German.Meeting on aerosols in natural science, medicine and technology-measurement techniques and technical application, Karlsruhe, F.R. Germany, 26 Oct 1977.
U.S. Sales Only.

In closed rooms, there is often a distinctly higher concentration of small ions than in free air. The author attributes this to increased ionization intensity caused by natural radioactive isotopes emitted from the walls, above all radon. Laboratory studies lead to the conclusion that for a person remaining in such a completely isolated room for one year the radiation dose to the bronchi would be extremely high and would amount to 100 rem/Y. (Atomindex citation 09:394936)

EMSL-LV-0539-36 PC **A06**/MF **A01**
Environmental Monitoring Systems Lab, Las Vegas, NV.
Offsite Environmental Monitoring Report for the Nevada Test Site and Other Test Areas Used for Underground Nuclear Detonations, January-December 1979.
G. D. Potter, R. F. Grossman, W. A. Bliss, D. J. Thome, and J. L. Hopper. Apr 80, 106p
Contract EY-76-A-08-0539

This report contains descriptions of pertinent features of the NTS and its environs, summaries of the EMSL-LV dosimetry and sampling methods, analytical procedures, and the analytical results from environmental measurements. Where applicable, dosimetry and sampling data are compared to appropriate guides for external and internal exposures of humans to ionizing radiation. (ERA citation 05:024630)

EUR-5805 PC **A03**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Measurement of Environmental Radioactivity. Ispra 1976.
G. Dominici. 1977, 50p
In Italian.
U.S. Sales Only.

In this report there are briefly described the measurements of environmental radioactivity performed during 1976 by the site survey group of the Protection Division of the Euratom Joint Research Centre - Ispra Establisment. Data are given on the concentrations of exp 90 Sr, exp 137 Cs and other radionuclides in precipitation, air, waters, herbage milk and radioactive effluents. The environmental contamination is mainly world-wide fall out. (Atomindex citation 10:426533)

FRNC-TH-740 PC **A06**/MF **A01**
Paris-6 Univ. (France).
Experimental and Theoretical Study of the Coagulation of Radiolysis Aerosols.
These (3e Cycle),
M. L. Perrin. 1976, 101p
In French.
U.S. Sales Only.

The processing of concentration measurement upstream and downstream of a diffusion battery to obtain the particle size distribution of an aerosol is first described. The uni- and bi-modal size distribution of an aerosol generated by radiolysis of atmospheric gaseous impurities has been then determined. The experimental data have been compared with the data supplied by numerical resolution of the coagulation equation. (Atomindex citation 10:436945)

FRNC-TH-846 PC **A08**/MF **A01**
Montpellier-2 Univ. (France).
Role of Organic Compounds of a River with Respect to Radioactive Pollution.
J. Faure. 1974, 151p
In French.These (D. es S.).
U.S. Sales Only.

Nuclear power plants discharge a limited amount of radioelements in rivers with their effluents. These radionuclides can combine with organic compounds contained in water and contaminate sediments. Organic compounds are approximately the same in water and sediments of the Rhone river. Complexation of an element and organic substances of molecular mass above 700 is a function of its position in the periodic classification of atoms. Results can be extrapolated to chemical pollution. Results concerning water-sediments interactions can be extrapolated to other rivers although composition and distribution of constituents are not identical. (Atomindex citation 11:505004)

LBL-9814 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Radiation Monitoring. Lecture 26, Course on Advances in Radiation: International School of Radiation Damage and Protection, Erice, Italy, September 1979.
R. H. Thomas. Sep 79, 36p
Contract W-7405-ENG-48

The practices and rationales of radiation monitoring as applied at high-energy accelerator laboratories are presented. Area, environmental, and personal techniques are discussed and examples given. (ERA citation 05:024631)

NUREG/CR-1195 PC **A16**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Measurement of XE-133, C-14, and Tritium in Air and I-131 in Vegetation and Milk Around the Quad Cities Nuclear Power Station,
J. H. Keller, D. W. Akers, S. W. Duce, B. G. Motes, and T. E. Cox. Jul 80, 370p ENICO-1023
Contract DE-AC07-79IDO1675

The objective of this program was to evaluate the air-grass-cow-milk model for predicting the I-131 dose from normal operations at an actual LWR. The Quad Cities Nuclear Station was selected as the candidate site and measurements were made for a three month period. The station gaseous effluent release rate was determined for I-131, Xe-133, Kr-85, C-14, and H-3. The chemical species of the released iodine and the oxidization state of the released C-14 and H-3 were determined. In the environment, measurements were made of the I-131 concentration in air at five sites. At two of these sites, determinations were made of the I-131 concentration in vegetation, milk, and precipitation and the Xe-133, C-14, and H-3 concentrations in air.

RISO-386 MF **A01**
Risoe National Lab., Roskilde (Denmark).
Environmental Radioactivity in Denmark in 1977.
A. Aarkrog, L. Boetter Jensen, H. Dahlgaard, H. Hansen, and J. Lippert. Jun 78, 133p
U.S. Sales Only. Microfiche copies only.

Strontium-90 was determined in samples from all over the country of precipitation, ground water, sea water, grass, dried milk, fresh milk, grain, bread, potatoes, vegetables, fruit, total diet, and human bone. Furthermore, exp 90 Sr was determined in local samples of air, rain water, grass, sea plants, fish, and meat. Cesium-137 was determined in soil, sea water, milk, grain products, potatoes, vegetables, fruit, total diet, fish, and meat. It was also measured by wholebody-counting of a control group at Risoe Health Physics Department. Estimates of the mean contents of radiostrontium and radiocesium in the human diet in Denmark during 1977 are given. The gamma -background was measured regularly by TLD, ionization chamber and on site gamma spectroscopy at locations around Risoe, at ten of the State experimental farms along the coasts of the Great Belt and around Gyllingnaes. The marine environments at Barsebaeck and Ringhals were monitored for exp 137 Cs and corrosion products (exp 58 Co, exp 60 Co, exp 65 Zn, exp 54 Mn). Results of plutonium determinations in soil and sediments from 1977 are presented in this report. Tritium was determined in groundwater and precipitation. Finally the report includes routine surveys of environmental samples from the Risoe area. (Atomindex citation 11:496604)

SAND-79-6002 PC **A02**/MF **A01**
Ecole Nationale Superieure des Mines de Paris, Fontainebleau (France). Centre d'Information Geologique.
Representation of Radioelement Migration in Fissured Rocks by a Mathematical Model.
P. Goblet, E. Ledoux, G. de Marsily, and A. Barbreau. Sep 79, 14p CONF-790161-1(Trans.)
Contract EY-76-C-04-0789
C paper presented at the symposium on radionuclide migration, Brussels, January 29-31, 1979.Symposium on radionuclide migration, Brussels, Belgium, 29 Jan 1979.

The migration of elements in solution in fissured rocks is approached by a method in which the fissured medium is described by way of the equivalent continuous, heterogeneous, anisotropic medium. The retention of the substances is represented by limited adsorption mechanisms within the fissure planes. After an explanation of the principle on which this model is built, a sample interpretation is given for tracing experiments performed with a fissured granitic massif by the Bureau de Recherches Geologiques et Minieres (BRGM; Bureau of Geological and Mining Research) and by the Centre d'Etudes Nucleaires de Grenoble (CENG; Grenoble Center for Nuclear Studies). This work was carried out for the Commission of the European Economic Communities and the French Atomic Energy Commission under a cost-sharing contract regarding the indirect action program on Management and Storage of Radioactive Waste. (ERA citation 05:007631)

SAND-79-6006 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Adsorption and Cation Exchange During Unidirectional Flow in a Saturated Porous Medium.
J. Rochon. Nov 79, 20p
Contract EY-76-C-04-0789
A Reunion de travail sur l'utilisation des mineraux argileux pour le confinement des dechets radioactifs, September 10-12, 1979, Paris, France.Translated by Cathy Flick.

Several models are proposed to simulate transport of an ionic substance interacting with a homogeneous porous matrix. The types of interaction studied are reversible adsorption, irreversible adsorption, and cation exchange; these are the predominant phenomena in clay media. These models were devised with regard for the simplification necessary for their further use in interpretation of soil data or in predictive calculations. (ERA citation 05:009214)

SCPRI-RM-12-1977 PC **A03**/MF **A01**
Service Central de Protection Contre les Rayonnements Ionisants, Le Vesinet (France).
Progress Report. Details of the Monthly Results of Measurements.
Dec 77, 36p
In French.
U.S. Sales Only.

Measurement tables concerning the surveillance of the environment (see also the SCPRI-RT-4-1977 report). (Atomindex citation 10:458878)

SCPRI-RT-4-1977 PC **A02**/MF **A01**
Service Central de Protection Contre les Rayonnements Ionisants, Le Vesinet (France).
4. Quarterly Progress Report, 1977.
1977, 23p
In French.
U.S. Sales Only.

This report of the SCPRI exposes an interpretation of the principal results concerning the surveillance of radioactivity in the environment: atmospheric dusts, rainwater, surface water, underground water, irrigation water, drinking water, food chain, sea water around nuclear plant sites and other sites. The activities of various radioisotopes are presented in tables (exp 7 Be, exp 95 Zr and exp 95 Nb, exp 103 Ru, exp 131 I, exp 137 Cs, exp 140 Ba and exp 140 La, exp 90 Sr, exp 106 Ru and exp 106 Rh, exp 226 Ra, exp 54 Mn, U and T). A bibliographic selection is also presented. (Atomindex citation 10:458875)

SSI-1978-033 PC **A02**/MF **A01**
Statens Straalskyddsinstitut, Stockholm (Sweden).
Radon Problems in Sweden. Investigations and Countermeasures.
J. O. Snihs, and H. Ehdwall. Nov 78, 8p CONF-7811127-1
Specialist meeting on personal dosimetry and area monitoring suitable for radon and daughter products, Paris, France, 20 Nov 1978.
U.S. Sales Only.

For some years radon has been of great concern in Sweden both as a source of occupational exposure in mines and other underground spaces and as a source of radiation exposures in dwellings has lately increased to a considerable extent and appropriate measurements and possible countermeasures are under intensive discussion. The policy and general principles of the supervision especially at work places are described here with a brief description of the progress of the development work on measuring methods. (Atomindex citation 10:437592)

STL-A-24 MF **A01**
Institute of Radiation Protection, Helsinki (Finland).
Natural Radioactivity of Ground and Surface Water in Finland.
M. Asikainen, and H. Kahlos. Jul 77, 32p
In Finnish.
U.S. Sales Only. Microfiche copies only.

In Finland a country-wide study on the radioactivity of natural and drinking water has been performed to elucidate the role of water as a factor increasing the background radiation dose. The study was concerned mainly with waterworks having more than 200 users in the circuit of their distribution system. Additional samples were collected from bored privately-owned wells and from mines. The samples were analysed for exp 222 Rn, exp 226 Ra and gross alpha and beta activity. As a further investigation from a part of samples determina-

tions of uranium and exp 228 Ra were also made. The variation of radioactivity in the ground and surface water samples is presented, as are the areal variations of exp 226 Ra and exp 222 Rn in water of wells and springs, the highest concentrations and anomalies found, and the occurrence of exp 222 Rn, exp 226 Ra and natural uranium in tap water samples of waterworks. About 20 percent of bored wells in the region of Helsinki and about 5 percent of bored wells in other parts of Finland contained highly radioactive water, in which, e.g., the concentration of exp 222 Rn was more than 100 000 pCi/l. In water of bored wells concentrations up to 1 200 000 pCi/l of exp 222 Rn, 202 pCi/l of exp 226 Ra, 181 pCi/l of exp 228 Ra and 3090 mu g/l of uranium were found. From the point of view of radiation protection, of the radioactive substances under study, exp 222 Rn in water is the most important. The greatest radiation dose resulting from the use of radon-rich water is caused by radon liberated into the air in buildings. (Atomindex citation 11:496636)

UCRL-83049 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Plutonium Mobilization from Sedimentary Sources to Solution in the Marine Environment.
V. E. Noshkin, and K. M. Wong. 1 Oct 79, 13p CONF-791050-1
Contract W-7405-ENG-48
Nuclear Energy Agency seminar on marine radioecology, Tokyo, Japan, 1 Oct 1979.

Inventories of plutonium radionuclides greatly in excess of global fallout levels persists in the benthic environments of Bikini and Eniwetok Atolls. It now appears that the atolls have reached a chemical steadystate condition with respect to the partitioning of exp 239+240 Pu between solution and solid phases of the environment. The mobilized exp 239+240 Pu has solute-like characteristics, passes rapidly and readily through dialysis membranes, has adsorption characteristics similar to those of fallout plutonium in the open ocean, and exists in solution primarily as some oxidized +5 or +6 chemical species. Water-column profiles of exp 239+240 Pu taken outside the atolls show a plutonium excess in the deep water mass. This remobilized exp 239+240 Pu possibly originates from the contaminated sediments previously deposited on the outer slopes of the atolls and surrounding basins. (ERA citation 05:001790)

18I. Reactor Engineering and Operation

AAEC/PR-44D PC **A03**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Nuclear Science and Technology Branch Report 1977. Divisional Research.
Dec 77, 28p
U.S. Sales Only.

Research programs are reported for the following divisions: Physics, Chemical Technology, Materials, Engineering Research, Isotopes, Instrumentation and Control, Health Physics Research and Applied Maths and Computing. Staff responsible for each project are indicated. (Atomindex citation 10:477561)

AED-Conf-77-316-006 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente.
Experimental Research on the Mass Transfer in Pressurized Water.
I. Michael. 1977, 15p CONF-7709137-1
In German.Conference on chemistry in power stations and feed-water with informative exhibition, Essen, F.R. Germany, 29 Sep 1977.
U.S. Sales Only.

The fundamentals of primary circuit contamination, the transport model, the autoclave system, the material investigated, water quality and analytics, interference oxide layer determination, metal contents in the autoclave water, deposit investigations, as well as the results of the corrosion examinations are described. (Atomindex citation 09:365085)

AED-Conf-77-329-005 PC **A03**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation (ZAED), Eggenstein-Leopoldshafen (Germany, F.R.).
Instrumentarium of the Federal Government for the Protection of the Population and Environment in Connection with the Construction of Nuclear Power Plants.
G. Hartkopf. 1977, 26p CONF-7710166-2
In German.Problems of nuclear energy supply - chances, risks and perspectives in a changing energy economy, Bonn-Bad Godesberg, F.R. Germany, 3 Oct 1977.
U.S. Sales Only.

The main lines of thought of reactor safety politics in the Federal Republic of Germany are presented on the basis of the Atomic Energy Act and the Radiation Protection Ordinance. In the annex a survey is given of related statutory ordinances, regulations, catalogues of rules, and recommendations as well as technical rules for the nuclear licensing procedure. (Atomindex citation 09:396135)

AED-Conf-77-498-016 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Activities on the Site During Construction Phase.
O. F. Fickel. 1977, 25p CONF-7709147-20
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

A survey is given of the work done on the site from site-opening till turn over of the plant to the client. After a short introduction to time schedules, manpower on site, site facilities and civil work and constructions, the commissioning and trial operation phase is discussed in detail. This phase begins with finishing the assembly of individual systems and components and ends with the trial operation and the acceptance measurement. During this period the subsystems are started-up in a useful sequence, first from cold, then from hot conditions and are finally operated as a total with nuclear energy. The single steps are: a) commissioning of indivudal systems; b) hot functional test 1 (without fuels) c) baseline inspection at the reactor pressure vessel; d) hot functional test 2 (with fuels); e) preparation for first criticality; f) postcriticality test program; g) trial operation: h) acceptance measurement. (Atomindex citation 09:383461)

AED-Conf-77-498-027 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Fuel Cycle Management.
H. C. Herbin. 1977, 8p CONF-7709147-69
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The fuel cycle management is more and more dependent on the management of the generation means among the power plants tied to the grid. This is due mainly because of the importance taken by the nuclear power plants within the power system. The main task of the fuel cycle management is to define the refuelling pattern of the new and irradiated fuel assemblies to load in the core as a function of: 1) the differences which exist between the actual conditions of the core and what was expected for the present cycle, 2) the operating constraints and the reactor availability, 3) the technical requirements in safety and the technological limits of the fuel, 4) the economics. Three levels of fuel cycle management can be considered: 1) a long term management: determination of enrichments and expected cycle lengths, 2) a mid term management whose aim corresponds to the evaluation of the batch to load within the core as a function of both: the next cycle length to achieve and the integrated power history of all the cycles up to the present one, 3) a short term management which deals with the updating of the loaded fuel utilisations to take into account the operation perturbations, or with the alteration of the loading pattern of the next batch to respect unexpected conditions. (Atomindex citation 09:386639)

AED-Conf-78-004-012 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Role of Man in Nuclear Power Plants.
H. Schenk. 1978, 18p CONF-780149-10
In German.Meating on the safety of the light-water reactor, Mainz, F.R. Germany, 16 Jan 1978.
U.S. Sales Only.

For the safety of a plant it is not essential that the personnel respond quickly and act accordingly; automatic control systems and safety equipment are there especially to this end. In addition to a critical forward-looking analysis of the specific conditions of the plant and to the operational work being carried out steadily and circumspectively, reliability and reactor safety are, however, essential prerequisites for operational success. To sum up, the author states 'that the operational personnel accept the nuclear power station as a safe place of work which is worthy of men, and to look at it the other way round, that the tasks, which have to be carried out by people in the nuclear power station, are executed by employees according to the demands laid down. The high safety, which can be realised in nuclear power stations, does not ask too much of people, but enables them to fully develop their capabilities there. (Atomindex citation 09:386670)

AED-Conf-78-155-027 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
New and Already Approved - the Power Plant Control System PROCONTROL K by Brown-Boveri.
R. Schumacher. 1978, 10p CONF-7804102-30
In German.Systems exhibition energy within the context of the Hannover fair, Hannover, F.R. Germany, 19 Apr 1978.
U.S. Sales Only.

The duty of the control system in power plants in to guide the process. With this a number of process states and process variables are generated and continuously monitored depending on the different operational conditions. Thermal power plants represent such a high plant asset that outages or limitations in power generation have to be avoided. In addition, high utilization of the process engineering components has to be aimed at for economic reasons. This requires extensive monitoring. As this can no longer be achieved manually, automatic installations for process control are used, assisting the operator and helping him to perform direct and concentrated interventions in the process in case of disturbances. (Atomindex citation 09:414923)

AED-Conf-78-155-033 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Transmission and Distribution of Information in Power Plants.
H. Pinkernell. 1978, 16p CONF-7804102-29
In German.Systems exhibition energy within the context of the Hannover fair, Hannover, F.R. Germany, 19 Apr 1978.
U.S. Sales Only.

Operation of modern large-site power plants is no longer imaginable without facilities for automatic control. Brown-Boveri Company has developed a promising control system for power plants called Procontrol k. An essential piece of the system is DATRAS k, a digital bus-oriented data transport system for transmitting and distributing signals in power plants. DATRAS will save a large amount of cables and reduce the constructional effect. It offers opportunities for diagnosis and service and by means of continuous monitoring of all system components it will essentially improve plant availability. (Atomindex citation 09:414922)

AEEW-R-1183 PC **A02**/MF **A01**
UKAEA, Reactor Group, Winfrith (England). Atomic Energy Establishment.
Zero-Power Basis of Fast Reactor Dosimetry.
J. E. Sanders. Jun 78, 18p
U.S. Sales Only.

Predictions of reaction rates, atomic displacements, and gamma-ray energy deposition in the prototype Fast Reactor are based on cross-section data and calculation methods validated against the results of zero-power experiments. The

paper reviews work in Zebra relevant to this dosimetry, including neutron spectrometry, power mapping, foil activations within core heterogeneities, and measurements with thermoluminescent detectors. Comparisons of experiment and calculation are discussed in relation to the accuracies required to meet materials testing objectives. (ERA citation 04:042907)

ASO/R-2 PC **A03**/MF **A01**
Australian Safeguards Office, Sydney.
Gamma Ray Measurement of Spent HIFAR Fuel Elements for Safeguards Verification. 1. Experimental Evaluation of Method.
G. L. Hanna. Jul 78, 22p
U.S. Sales Only.

Since 1970, IAEA safeguards inspectors have used gamma ray measurements of fission product activities to verify operator's data on burnup, cooling time, and integrity of fuel elements after irradiation in the HIFAR reactor. Experimental measurements were made in order to assess independently the value of the method as a safeguards technique for verifying burnup and cooling time. Result show that the precision of the method must be improved if useful information is to be obtained but a proper evaluation must include consideration of the theoretical basis of the method. This is presented in Part 2 of the report. (Atomindex citation 10:477532)

ASO/R-3 PC **A02**/MF **A01**
Australian Safeguards Office, Sydney.
Gamma Ray Measurement of Spent HIFAR Fuel Elements for Safeguards Verification. 2. Theoretical Evaluation of Method.
G. L. Hanna. Jul 78, 19p
U.S. Sales Only.

An empirical method of estimating burnup and cooling times of irradiated MTR fuel elements from gamma ray measurements of fission product ratios was developed by the IAEA for safeguards applications. Experimental evaluation of the method was discussed in Part 1 of this report and showed the method to be too imprecise as presently applied. A theoretical evaluation is reported here which shows that neutron flux density during irradiation will have an important influence on experimental results and suggests that failure to take due account of this could have lead to inherent imprecision in the empirical method. (Atomindex citation 10:477533)

BMFT-FB-K-79-02 PC **A03**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Design of a Double Control Element for PWR Reactors.
W. Kollmar, M. Wagner, P. Uyttendaele, L. Irion, and H. Seidelberger. Apr 79, 41p
In German.
U.S. Sales Only.

In order to improve the mechanical control rod concept two systems were designed, - a double control element, - a hydraulic control and scram system (Hyras). For both systems, neutron physical and economic problems were investigated, and some constructive details (position indicator, control rod drive) were clarified. (Atomindex citation 10:470669)

BMFT-FB-K-79-03 PC **A04**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
16-Rod-Bundle: Irradiation in the MZFR and Post-Irradiation Examinations.
R. Manzel. Apr 79, 52p
In German.
U.S. Sales Only.

In the course of the irradiation of a 16-rod prototype bundle, the basis has been established for the irradiation of experimental fuel assemblies containing full-length PWR fuel rods in standard positions of the MZFR. The prototype bundle was discharged after an irradiation time of 284 full power days and a burnup of 11400 MWd/tU. The overall performance of the prototype bundle was highly satisfactory. Detailed post-irradiation examinations confirmed the good conditions of bundle structures and fuel rods. (Atomindex citation 10:470730)

CEA-CONF-4329 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
Re-Irradiation and Limit Testing of the Fuels PWR Type Reactors.
M. Roche, and M. Molvault. 1978, 21p CONF-7805110-5
In French.Working group on irradiation devices, Petten, Netherlands, 18 May 1978.
U.S. Sales Only.

In view of investigating the neutron radiation behavior of PWR fuel pins, the S.P.S. (Services des Piles de Saclay) developed a set of experimental means used at OSIRIS in Saclay Nuclear Research Center. Said devices are shown to be able to meet present problems concerning can failures, power and temperature cycling, remote-control studies. These means can also be used either for statistical studies, they can then receive several samples, or for analytical studies in instrumented devices of large capacity and accelerated irradiation rate. (Atomindex citation 10:470475)

CEA-CONF-4339 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau.
Numerical Method for a Transient Two-Fluid Model.
G. Le Coq, and M. Libmann. 1978, 15p CONF-7805170-2
Phase Flow Group meeting, Stockholm, Sweden, 28 May 1978.
U.S. Sales Only.

The transient boiling two-phase flow is studied. In nuclear reactors, the driving conditions for the transient boiling are a pump power decay or/and an increase in heating power. The physical model adopted for the two-phase flow is the two fluid model with the assumption that the vapor remains at saturation. The numerical method for solving the thermohydraulics problems is a shooting method, this method is highly implicit. A particular problem exists at the boiling and condensation front. A computer code using this numerical method allow the calculation of a transient boiling initiated by a steady state for a PWR or for a LMFBR. (Atomindex citation 10:470299)

CONF-800434-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
ORNL Experiments to Characterize Fuel Release from the Reactor Primary Containment in Severe LMFBR Accidents.
A. L. Wright, T. S. Kress, and A. M. Smith. 1980, 16p
Contract W-7405-ENG-26
CSNI specialist meeting on nuclear aerosols in reactor safety, Gatlinburg, TN, USA, 15 Apr 1980.

This paper presents results from aerosol source term experiments performed in the ORNL Aerosol Release and Transport (ART) Program sponsored by the US NRC. The tests described were performed to provide information on fuel release from an LMFBR primary containment as a result of a hypothetical core-disruptive accident (HCDA). The release path investigated in these tests assumes that a fuel/sodium bubble is formed after disassembly that transports fuel and fission products through the sodium coolant and cover gas to be relased into the reactor secondary containment. Due to the excellent heat transfer characteristics of the sodium, there is potential for large attenuation of the maximum release. (ERA citation 05:024086)

CONF-800607-15 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Assessment of Molten Debris Freezing in a Severe RIA in-Pile Test.
M. S. El-Genk, and R. L. Moore. 1980, 5p
Contract EY-76-C-07-1570
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

An understanding of the freezing of molten debris on cold core structures following a hypothetical core meltdown accident in a light water reactor (LWR) is of importance to reactor safety analysis. The purpose of the present investigation was to analyze the transient freezing of the molten debris produced in a severe reactivity initiated accident (RIA) scoping test, designated RIA-ST-4, which was performed in the Power Burst Facility and simulated a BWR control rod drop accident. In the RIA-ST-4 experiment, a single, unirradiated, 20 wt % enriched, UO sub 2 fuel rod contained within a Zircaloy flow shroud was subjected to a single power burst which deposited a total energy of about 700 cal/g UO sub 2 . This energy deposition is well above what is possible in a commercial LWR during a hypothetical control rod drop (BWR) or ejection (PWR) accident. However, the performance of such an in-pile test has provided important information regarding molten debris movement, relocation, and freezing on cold walls. (ERA citation 05:024088)

COO-4325-02 PC **A07**/MF **A01**
Consolidated Edison Co. of New York, Inc., New York.
PWR Steam Generator Chemical Cleaning. Phase II. Final Report.
Jan 80, 127p
Contract EN-77-C-02-4325

Two techniques believed capable of chemically dissolving the corrosion products in the annuli between tubes and support plates were developed in laboratory work in Phase I of this project and were pilot tested in Indian Point Unit No. 1 steam generators. In Phase II, one of the techniques was shown to be inadequate on an actual sample taken from an Indian Point Unit No. 2 steam generator. The other technique was modified slightly, and it was demonstrated that the tube/support plate annulus could be chemically cleaned effectively. (ERA citation 05:024046)

DR-GSTS-04/78 PC **A08**/MF **A01**
Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro. Dept. de Reatores.
Analysis of the Core Reflooding of a PWR Reactor under a Loss-of-Coolant Postulated Accident.
Tese (M.Sc.),
H. Austregesilo Filho. Dec 78, 153p
In Portuguese.
U.S. Sales Only.

The main purpose of this work is to analyse the termohydraulic behaviour of emergency cooling water, during reflooding of a PWR core submitted to a postulated loss-of-coolant accident, with the scope of giving the boundary conditions needed to verify fuel element and containment integrity. The analytical model presented was applied to the simulation of Angra I core reflooding phase, after a double-ended break between pressure vessel and discharge of one of the main coolant pumps. For this accident, with a discharge coefficient of C sub(D) = 0.4, the highest peak cladding temperature is expected. (Atomindex citation 11:496842)

EGG/LTR-LO-0080-113 MF **A01**
Idaho National Engineering Lab., Idaho Falls.
LOFT Experimental Programs Division. Volume II. Calibration of the LOFT Modular DTT and the LOFT Production DTT with a Small Drag Disc.
C. W. Solbrig, G. B. Shull, R. R. Good, L. L. Chen, and J. Reimann. 11 Feb 80, 253p
Contract EY-76-C-07-1570
Microfiche copies only.

Phase II of the LOFT Test program in Germany, consisted of two-phase flow calibrations in the three-inch pipe. The instruments intended for calibration were the LOFT Modular Drag Disk Turbine Transducer (MDTT) and a three-beam gamma densitometer. The DTT is of the modular design and is representative of the type to be used in the LOFT L2 (nuclear) series. The test section provides free field calibrations; that is, the DTT is smaller than the inside diameter of the test section. The gamma densitometer is a three beam unit representative of the configuration used in LOFT, but modified to fit on a smaller pipe. (ERA citation 05:024081)

EUR-5971 PC **A02**/MF **A01**
Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements.
Calculation of Oxygen Distribution in Uranium-Plutonium Oxide Fuels During Irradiation (Programme CODIF).
A. Moreno, and C. Sari. 1978, 23p

U.S. Sales Only.

Radial gradients of oxygen to metal ratio, O/M, in uranium-plutonium oxide fuel pins, during irradiation and at the end of life, have been calculated on the basis of solid-state thermal diffusion using measured values of the heat of transport. A detailed computer model which includes the calculation of temperature profiles and the variation of the average O/M ratio as a function of burn-up is given. Calculations show that oxygen profiles are affected by the isotopic composition of the fuel, by the temperature profiles and by fuel-cladding interactions. (Atomindex citation 10:423798)

FEI-669 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Fuel Assembly Cooling by Heat Conduction.
B. F. Gromov, N. I. Buleev, L. D. El'tsova, K. N. Polosukhina, and A. A. Sholokhov. 1976, 32p
In Russian.
U.S. Sales Only.

Considered is the problem of cooling an active assembly consisting of fuel elements and fixed coolant. Heat is dissipated in the lateral direction owing to heat conduction. Determined were the coefficients for effective heat conductivity of the assemblies with various thermal-physical and geometric characteristics. Examplified are calculations of cooling of the waste fuel element packet and fusion zone at the breakdown of the reactor cooling system. (Atomindex citation 10:430470)

FEI-670 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Semiempiric Calculation Methods for Heat Transfer in Chess Rod Clusters in a Longitudinal Coolant Flow with the Moderate Prandtl Numbers.
A. V. Zhukov, A. B. Muzhanov, and P. A. Ushakov. 1976, 22p
In Russian.
U.S. Sales Only.

Systematized and analyzed are the calculations of heat exchange in the chess bundles of rods. Noted is the lack of calculations for the closely-spaced lattices of the fuel elements which most strongly reveal dependence of the heat transfer and temperature fields on the relative spacing and equivalent heat conduction of the fuel elements. Further developed is the hypothesis on the general nature of the local heat transfer coefficients in complicated-shaped channels. (Atomindex citation 10:430494)

FEI-701 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Performance of Hexahedral Jackets of Fast Power Reactor Fuel Assembly.
A. A. Proshkin, and L. M. Zabud'ko. 1976, 39p
In Russian.
U.S. Sales Only.

Presented is the procedure for determination of the performance of the fast reactor hexahedral jackets located in the central portion of the core under the effect of stresses caused by the coolant pressure, and stresses caused by possible interaction of the fuel element cluster and hexahedral jacket. The analysis of the performance of the hexahedral jackets of the fast power reactors in accordance with the elaborated procedure makes it possible to reveal certain peculiar features in the jacket behaviour: a considerable effect on the stress-deformation state of the jacket is produced by the rounding radius in the corners of the hexahedral jacket at Ssub(in)/rho $<$30 (Ssub(in) is the internal dimension, rho is the rounding radius). The static analysis of the performance of the hexahedral jackets provides for determination of a series of main factors which greatly affect accuracy of calculation of the jacket performance. These factors include, first of all, radiation creep, swelling of the jacket material and jacket thickness. (Atomindex citation 10:430701)

FEI-771 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Reactor Control by Means of Mini-Computer in Real Time.
Yu. I. Yazykov, A. V. Andriashin, and M. A. Khassan. 1977, 13p
In Russian.
U.S. Sales Only.

Described is the system intended for automatic program control and supervision of the nuclear reactor with the aid of a miniature computer, without participation of the operator, in the following modes: development of the desired power in the reactor, operation of the reactor under stationary conditions within a preset time period, transition to another power level, disengagement of the reactor at the end of the preset operating time. 25 starting cycles of the reactor have been performed which prove that the system reliably operates unless the miniature computer and the communication circuits are malfunctioning. Module arrangement of the program portion of the system offers good opportunities for its expansion and check. The system employs only 3% of the miniature computer operating time, so that it is expedient to operate the computer in the multiprogram mode. The memory of the computer includes 16 K, 8 K being allotted for the program and 8 K for the starting history block. (Atomindex citation 10:430721)

FEI-861 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Study on Boiling Water Noises in a Large Volume. Behaviour of Noise Characteristics During Burnout.
R. F. Masagutov, V. A. Krivtsov, V. S. Yuga , V. N. Zhukovets, and V. N. Vorob'ev. 1978, 11p
In Russian.
U.S. Sales Only.

Presented are the results of the experimental study of spectral characteristics of local water boiling noises in a large volume at the pressure of 1 at. The water boiling took place at horizontal tubes made of the Kh18N10T steel with the length of 50 mm, diameter of 2 mm and the wall thickness of 0.1 mm. The degree of water underheating up to the saturation temperature and the density of the thermal flow on the heat transfer surface were changed in the experiments. The dependences of noise level in various frequency bands on the value of thermal flow density up to the overburning of the heat transfer surface are shown. Considered also are the changes in time of the spectral noise characteristics during the burnout development. (Atomindex citation 11:497047)

FRNC-TH-744 PC **A07**/MF **A01**
Paris-11 Univ., Orsay (France).
Contribution to the Development of a Neutronic Computation Scheme of Water Moderated Nuclear Reactors Provided with Plate Fuels.
B. Noel. 127p
In French.These (3e Cycle).
U.S. Sales Only.

This thesis comprises two parts. First, the present computation diagram used for CAS type reactors is completed by studying fuel plate reactors. The effects of homogenization of the Zr rodlets in the plates, and the plates inside the fuel cluster on the exp 238 U resonance capture; are examined effective fuel temperature and the development of the AZUR IV calculation of the core for fuel-plate reactors; are investigated and the use of APOLLO, DOT, NEPTUNE, and the KERA procedure are explained. The comparison between experimental and computed temperature coefficients leads to fit the exp 235 U fission cross section with view toward correcting the computer error on the temperature coefficient under estimation of 2-3 pcm/exp 0 C). (Atomindex citation 10:473906)

FRNC-TH-783 PC **A11**/MF **A01**
Lyon-1 Univ. (France).
Study of Transient and Permanent Flow in the Event of Natural Convection in a Confined Environment.
D. Tenchine. 1978, 226p
In French.These (D. Ing.).

U.S. Sales Only.

This report deals with natural convection in a confined environment, in connection with the studies on the safety of nuclear reactors of the sodium cooled breeder type (possibilities of removing the residual power of the fuel by natural convection in the liquid sodium). These natural convection exchanges develop in a confined environment between various sodium volumes separated by metallic structures. The study covered a cavity heated by the roof or by the bottom and cooled laterally. The results are compared with those achieved along heating plates, vertical or horizontal, in an infinite medium and the effect of the thermal limit conditions are highlighted by comparison with the case of bottom heated and roof cooled cavities. Placed in a bidimensional geometry situation, with water as fluid, this leads to tackling the problems of similarity between water and sodium flows. A digital code has been developed in plane bidimensional geometry with a laminar and permanent flow. A description is given of the 'BIDIM' experimental rig as well as the measuring and display devices. A permanent flow study of the two previously mentioned configurations produces references for the analysis of transient flows, particularly in the case of bottom heating (field of medium temperatures and medium exchange coefficient). The turbulence intensity and frequency distribution determinations of the temperature changes are given. Then the determinations in transient flow are dealt with in the case of bottom heating. The cavity being initially cold, a power rise is initiated in the heating plates and the establishment and growth of natural convection and the change in the field of medium temperatures and exchange coefficient are studied. (Atomindex citation 10:473992)

GRS-F-63 PC **A22**/MF **A01**
Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Cologne (Germany, F.R.).
Report on the Research Projects in the Field of Reactor Safety Sponsored by the Federal Minister for Research and Technology. Period under Report: January 1 - March 31, 1978.
Sep 78, 520p
In German.
U.S. Sales Only.

Investigations on the safety of Light Water Reactors (LWR) being performed in the framework of the Research Program Reactor Safety (RS - Projects) are sponsored by the BMFT (Federal Minister for Research and Technology), Bundesminister fuer Forschung und Technologie. Objective of this program is to investigate in greater detail the safety margins of nuclear power plants and their systems and the further development of safety technology. Besides the investigations of LWR tasks first projects on the safety of FBR type reactors are sponsored by the BMFT. The GRS (Reactor Safety Association), Gesellschaft fuer Reaktorsicherheit mbH, by order of the BMFT, informs continuously of the status of such investigations by means of quarterly and annually publication of progress reports within the series GRS - F - Fortschrittsberichte (GRS - F - Progress Reports). Each progress report represents a compilation of individual reports about objectives, the work performed, the results, the next steps of the work etc. The individual reports are prepared in a standard form by the contractors themselves as a documentation of their progress in work. The individual reports are arranged according to the amended LWR Safety Research Program of the BMFT. Another table contents uses the same classification system as applied in the Nuclear Safety Index of the CEC Communities and the OECD. (orig./HP) 891 HP. (Atomindex citation 10:430273)

IAE-2792 PC **A03**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Methods for Analyzing Stability of Closed Control Systems with Markedly Nonlinear Characteristics.
V. A. Kuz'micheva. 1977, 29p
In Russian.
U.S. Sales Only.

The solutions of dynamic equations of NPPs with WWER type reactors having closed automatic power control systems are analyzed in terms of

their stability and asymptotic behaviour. Power relays with pronounced nonlinear characteristics are built-in features of the control system. The algorithm is written in FORTRAN-CERN for a BESM-6 computer. The code is capable of analyzing the stability in terms of the Lyapunov method and the asymptotic behaviour of the solutions up to the 5Oth order. (Atomindex citation 10:433666)

IAE-2822 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Method for System Simplification for Studying Stability.
Yu. N. Lapin. 1977, 26p
In Russian.
U.S. Sales Only.

A method of system simplification approximation is proposed which is aimed at defining stability regions and obtaining corresponding approximate analytical expressions. The method is tackled in general for an object under control,the linearized equations of which look like equations of an indirect control system. Formulas are derived for evaluating errors of the approximations. The usefulness of the method is exemplified by an automatic reactor start-up system. (Atomindex citation 10:430716)

IAE-2845 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
R,phi,Z - Geometry Calculation of Temperature Fields in Porous Media with Spatial Nonuniformity of Heat Release.
M. D. Segal'. 1977, 10p
In Russian.
U.S. Sales Only.

The r,phi,z geometry calculation technique of temperature fields in case of gas flowing in homogenizing medium with spatial nonuniformity of heat release, characterized by volume porosity and hydraulic diameter is considered. The AVR reactor output temperature field is calculated as an example. The reactor has at core of 3m diameter consisting of spherical charging approximately 10 exp 5 spheres of 60 mm diameter). According to the estimation the coefficient of the heat release nonuniformity is equal to 1.25. It is found that the temperature field formation is affected by the initial nonuniformity of the heat release and besides that by two processes: mixing and overheating of hot cells due to the nonuniformity of consumption. The results show a relatively weak effect of mixing processes due to small quantities of consumption intensity in the given type of apparatuses. The given techniqUe can be used for calculating temperature fields in any homogenizing medium, if the quantities of hydraulic resistance, heat transfer and effective transfer coefficients are known. (Atomindex citation 10:430484)

IAE-2938 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Mechanisms of Radiation Creep.
V. V. Kolomytkin. 1978, 16p
In Russian.
U.S. Sales Only.

Two groups of radiation creep mechanisms of materials in reactor irradiation are considered: dynamic mechanisms based on the formation of point defects during the interaction of neutrons or fission fragments and atoms of the crystal lattice and structural mechanisms based on the ation of the structure of matevarials and which are reduced to the strengthening or weakening of the material. Calculation and experimental data on radiation creep are presented. It is shown, that the presence of any mechanism of radiation creep depends considerably on temperature, stresses applied, intensity and neutron flux spectrum, neutron fluence as well as on the material properties. (Atomindex citation 10:465730)

IEA-DT-056 PC **A04**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Calculation of Reactivity of Control Rods in Graphite Moderated Reactors.
Thesis,
H. Nakata. May 78, 64p
In Portuguese.
U.S. Sales Only.

A study about the method of calculation for the reactivity of control rods in graphite-moderated critical assemblies, is presented. The result of theoretical calculation, developed by super celles and Nordheim-Scalettar methods are compared with experimental results for the critical Assembly of General Atomic. The two methods are then applicable to reactivity calculation of the control rods of graphite moderated critical assemblies. (Atomindex citation 10:430718)

IEA-DT-058 PC **A08**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Determination of the Safety Zones of Angra dos Reis Nuclear Power Plant, According to the Model of Radion Diffusion in the Atmosphere.
Thesis,
M. D. Santina. Jun 78, 161p
In Portuguese.
U.S. Sales Only.

The safety distance for Angra dos Reis Nuclear Power Plant are calculated, based on the model of the maximum credible accident for PWR power reactors and on the calculation of the dose due to hypothetical accidental release of radioactivity, using the model of radiation dispersion in the atmosphere. The safety distances for the Angra dos Reis reactors are also calculated using the model of the nine accident categories of the Rasmussen Report. The values of probability associated to each type of accident are used with the respective fractions of radiation release to the atmosphere. The soil contamination is also calculated for all the accidents considered and for several conditions of atmospheric stability, according to the model developed by Chamberlain. The program ACRA-II is used for calculation of the diffusion of radiation in the atmosphere, and the doses associated with it. (Atomindex citation 10:430348)

IJS-106/5012-77 MF **A01**
Institut Jozef Stefan, Ljubljana (Yugoslavia).
Burn-Up Calculations in Nuclear Power Plants.
M. Copic, M. Ravnik, J. Rant, Q. Khan, and S. Slavic. 1977, 41p
In Slovenian.
U.S. Sales Only. Microfiche copies only.

For the burn-up calculations in power reactors a fast version of a multigroup diffusion code FASVER has been developed, characterized by an expandable square grid, the step of which can be adapted to the group diffusion length. The input data for FASVER are detained from the code RIBOT, received from NEA computer program library. (Atomindex citation 10:423836)

IKE-2-42 PC **A08**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Modular Program System for the Control of Multivariable Systems, Illustrated by the Example of the Power Treatment System of an In-Core Thermionic Reactor.
Diss. (D.Eng.),
H. Klaiss. 8 Aug 78, 162p
In German.
U.S. Sales Only.

For an optimal utilization of the power generated in an incore thermionic reactor, a power processing system must be installed between power generator and consumer. A d.c. transformer with a functional design was chosen for this. For the transformer and for the reactor together with the transformer (overall model), a linear and non-linear mathematical model has been established for a simulation of the dynamic processes. Several control concepts for the plant have been investigated. For a better comparison with conventional methods and with state variable methods, a modular program (MEFARE) has been developed which automates the design of control systems according to the method of state variable feedback on the basis of the system, input, and output matrices of the linearized system. The program checks whether or not a system can be controlled and breaks it up into sub-systems in order to decide whether the desired transformation behaviour is possible. If it is not, it is then extended with the aid of Slivinsky's compensation formalism (SLICOMP program). The new output system is then decoupled again in order to became suitable for the application of the theory of single-variable systems according to Melsa (STVAR program), so that the desired feedback matrices can be calculated.The control concept set up with this program is tested on the models developed by showing that the desired guidance behaviour can be realized. (orig.) 89t RW. (Atomindex citation 10:430715)

IKE-2-46 PC **A10**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Description of Steam Flow and Structural Heat-Up During a Hypothetic Core Meltdown Accident by a Modular Computer Model.
Diss. (D.Eng.),
R. Veihelmann. 18 May 79, 220p
In German.
U.S. Sales Only.

The assumption of a reactor core left alone without any cooling facility leads to the hypothetical core meltdown accident. Within the scope of a modular system of computer codes for description by calculation of the relevant heat-up and failure phenomena within the reactor pressure vessel there is established a model for simulating the interaction between partly flooded reactor vessel including internals and dried out region of the active core, this model being applied in the two code units KOCH and UMGEB. By KOCH the time and space dependant steam supply in the core is specified, by UMGEB heating of the support structure relevant for the accident sequence is coupled to the active core region. Both code units together with the other modules of the system allow a flexible simulation of the core meltdown accident. This is demonstrated for a 1000 MWe model reactor by means of the two examples 'flooded core' and 'dry core'. (Atomindex citation 11:496863)

IKE-6-118 PC **A04**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Recalculation of a Critical Configuration of Fuel Assemblies for a BWR on the Basis of ENDF/B-IV Data.
R. Wartmann, and W. Bernnat. Sep 78, 63p
In German.
U.S. Sales Only.

In this paper there is described the recalculation of a critical experiment performed by KWU. The experiment was carried out with a configuration of 4 x 4 BWR fuel assemblies. There were measured power form factors of the rods in a 8 x 8 cluster and the critical water level. The paper first of all deals with the creation of a 60-group library with microscopic cross-section. Then there is described the calculation of macroscopic group constants for computation with the finite-difference code DIFF-2D and the 3D-Monte-Carlo code MORSE-K. For this purpose there were performed cell calculations with different types of cells and supercells for the calculation of the homogenized cross-sections. The results obtained with the computer codes DIFF-2D and MORSE-K agree well with each other and with the results of the measurements. Finally the follow some sensitivity studies for the reactivity. (Atomindex citation 10:470506)

INDC(CCP)-125/LV PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Comparison of Calculations of Standard Fast Reactors. (Using the Baker Model).
A. I. Voropaev, A. A. Van'kov, and A. M. Tsybulya. Oct 78, 30p
U.S. Sales Only.

The results of calculations of standard fast reactors performed in several laboratories with different sets of constants (OSKAR-75, BNAB-M, CARNAVAL-IV, FD-5, KFKINR, ENDF/B-IV) are compared. (Atomindex citation 10:470505)

INIS-mf-4129 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Order No.104 Relating to the Competence of the Institute for Radiation Protection Made on 14 February 1975.
1975, 1p

in Finnish.
U.S. Sales Only.

Order 104 made in implementation of Section 3 of Act No 174 of 26 April 1957 on Radiation Protection was published in the Finnish Official Gazette No 100-109 of 18 February 1975 and came into force on 1 March 1975. It lays down that the Institute is competent for issuing the licences, which under Section 2 of the Act are required for the production, transport, import, export, possession and trade in radioactive substances, as well as for the use of all radiation-generating facilities and equipment, except for those needed for medical purposes. Licences concerning activities referred to in the Atomic Energy Act of 25 October 1957 will continue to be issued by the Ministry of Trade and Industry. (Atomindex citation 09:366189)

INIS-mf-4492 PC **A02**/MF **A01**
Commission of the European Communities, Brussels (Belgium).
Structural Dynamic Analysis of BWR MARK II Plant under SRV Blowdown Oscillation.
T. A. Jaeger, and B. A. Boley. 1977, 1p
U.S. Sales Only.

This paper describes investigations conducted for the determination of SRV blowdown effects on structures, equipment and piping systems. The plant selected for this investigation has a combination structural arrangement which combines the Reactor, Auxiliary, Control, Fuel Handling, radwaste and dissel building into one nearly square shaped building with the primary steel containment and its concrete shield structure located at center of the common foundation mat. This combination building is reasonably symmetrical about both the N-S and the E-W axes and therefore could be treated as such to reduce analysis effort in the mathematical modeling and response calculations. Finite element techniques are used for the structural response investigations. The mathematical model consists of membrane and bending elements representing one half of the combination building resting on series of springs simulating the elastic half space of soil medium underneath the structure. The damping behavior of the structural system has been carefully determined with the assitance of two other studies involving the soil-structure interaction analyses. The mathematical model is then subjected to the SRV blowdown loads in the digitized form to determine structural responses at critical locations. In-structure response spectrum at selected locations are also generated. The results of these investigations are then used to examine the capabilities of other important items such as the reactor pressure vessel, the reactor internals and the steel containment under the influence of the SRV blowdown load simultaneously with other loads which can be reasonably postulated to occur. (Atomindex citation 09:414930)

INIS-mf-4593 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Regulations on the Supervision and Use of Installations, Apparatus, Material and Substances Which Release Ionizing or Other Radiation Representing Danger to Health (23 January 1976).
2p
In Norwegian, English.
U.S. Sales Only.

These Regulations repeal the Regulations of 22 October 1948 on the surveillance of facilities using X-rays and radium. They were issued in the Norwegian Official Gazette, 1st Section of 3 February 1976, and contain instructions on the control and use of facilities, devices, equipment and substances emitting ionizing radiation hazardous to health. This control applies to use for medical, veterinary, scientific, industrial or to ionizing radiation for other purposes as well as to all vessels, waste and discharge of substances emitting ionizing radiation. Finally, the Regulations specify the competent body, the type of devices concerned, and the duties of persons using such devices. (Atomindex citation 10:421647)

INIS-mf-4775 MF **A01**
Kraftwerk Union A.G., Erlangen (Germany, F.R.).
Protection Against External Impacts and Missiles - Load Assumption and Effects on the Plant Design of a 1300 MW PWR-Plant.
O. Gremm, and K. H. Orth. 1978, 8p CONF-781022-66
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only. Microfiche copies only.

The load assumptions and effects of the external impacts are given. The fundamental properties of the KWU standard design according to these impacts and the consequences for the engineering safeguards are explained. The protection against external impacts includes the protection against all external missiles. The basic measure of protection against internal missiles is the strict separation of redundancies. (Atomindex citation 10:445221)

INIS-mf-4777 MF **A01**
Australian Atomic Energy Commission, Coogee.
Quantitative Techniques for Nuclear Plant Safety Assessment and Design.
T. J. Moss. 1978, 9p CONF-781022-70
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only. Microfiche copies only.

The increasing possibility for using quantitative risk and reliability criteria in the siting and licensing of nuclear plant raises various problems for those who must decide if and how such requirements will be incorporated into the regulatory review framework. The analysis of a system which raises important issues and problems related to the use of quantitative risk and reliability methods and requirements in the design assessment process is discussed. In particular, the development of a fast fault tree method useful for the evaluation of large trees is discussed and the comparative performance of the method with well-known codes presented. It is suggested that the method may lend itself to further improvement in terms of computing efficiency and a role for an ultra fast fault tree resolution method capable of dealing with large fault trees is discussed. (Atomindex citation 10:445254)

INIS-mf-4972 PC **A02**/MF **A01**
Comitato Nazionale per l'Energia Nucleare, Bologna (Italy).
Loss of Coolant Analysis for CIRENE-LATINA Heavy Water Reactor.
B. Chiantore, M. Dubbini, and G. Proto. 1978, 9p
U.S. Sales Only.

CIRENE is a heavy-water moderated, boiling water cooled pressure tube reactor. Fuel is natural uranium. A variety of breaks in the primary coolant system have been postulated for the analysis of the CIRENE Latina Plant (now under construction) such as double-end break of inlet header, downcomer, steam line and inlet feeders. The basic tool for analysis is the TILT-N Code which has been purposely developed for simulating the nuclear, thermal and hydrodynamic behaviour of the CIRENE core and associated heat transport system. An extensive full-scale test programme has been carried out by CNEN and CISE which fully confirms the adequacy of the model. The main results of the analysis show that maximum temperatures are far from those leading to significant fuel damage and that adequate core cooling is provided over the whole transient. (Atomindex citation 10:458800)

INIS-mf-5114 PC **A03**/MF **A01**
Nijverheidsorganisatie TNO, The Hague (Netherlands). Projectgroep Kernenergie TNO.
Report of the Activities During the Years 1977 and 1978.
8 Feb 79, 28p
In Dutch.
U.S. Sales Only.

An introduction with general aspects is followed by more detailed descriptions of the separate projects concerned with sodium cooled, fast breeder reactors. These include material for use at high temperatures, safety related applied mechanics, specific sodium technology, joining techniques, heat transfer and current, not destructive testing, and pump developments. (Atomindex citation 10:470766)

INIS-mf-5132 PC **A03**/MF **A01**
Vereinigung Deutscher Elektrizitaetswerke e.V., Frankfurt am Main (Germany, F.R.).
Nuclear Power under Strain.
Aug 78, 31p
In German.
U.S. Sales Only.

The German citizen faces the complex problem of nuclear power industry with slight feelings of uncertainty. The topics in question can only be briefly dealt with in this context, e.g.: 1. Only nuclear energy can compensate the energy shortage. 2. Coal and nuclear energy. 3. Keeping the risk small. 4. Safety test series. 5. Status and tendencies of nuclear energy planning in the East and West. (Atomindex citation 10:469974)

INIS-mf-5134 PC **A04**/MF **A01**
Ministerium fuer Arbeit, Gesundheit und Soziales des Landes Nordrhein-Westfalen, Duesseldorf (Germany, F.R.).
Safety of HTR Reactors. A Contribution to the Discussion on the Peaceful Use of Nuclear Power.
1978, 51p CONF-770785-1
In German.Colloquium on the safety of HTR reactors. A contribution to the discussion on peaceful use of nuclear energy, Juelich, F.R. Germany, 4 Jul 1977.
U.S. Sales Only.

The papers and discussions of a colloquim presented in this paper give an outline of the state of development and planning of HTR reactors, especially their safety. Due to its special safety characteristics, the sites available in West Germany, and its future role in coal utilisation, the HTR should be paid particular attention. (Atomindex citation 10:470707)

INIS-mf-5259 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France).
Model of the Failure Rates of the Valves of St Laurent des Eaux Power Plant According to Influential Parameters.
F. Bouscatie, P. Fourcade, J. P. Georgin, and C. Roy. 1978, 7p CONF-781022-131
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only.

We intend in this paper to study the reliability of the valves of Saint Laurent des Eaux in terms of their characteristics (section, type, fluid, pressure, temperature) with the help of: data analysis methods (histograms, factorial analysis); mathematical statistics methods (analysis of the trends of the Poisson's law parameters, semi-parametric tests). These methods will allow us to choose the most meaningful parameters and to evaluate their influence. These approaches, which consider the failure rates as functions of the parameters, seem to give some new insights to the state of the art. (Atomindex citation 11:502965)

INIS-mf-5401 PC **A05**/MF **A01**
Hanover Univ. (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Development of Methods for Burn-Up Calculations for LWR'S.
W. Jaschik. 4 Jul 78, 87p
In German.Diss. (D.Eng.).
U.S. Sales Only.

This method is based on all burn-up depending data, namely particle densities and neutron spectra, being available in a burn-up library. This one is created by means of a small number of cell burn-up calculations which can easily be carried out and in which the heterogeneous cell structure and self-shielding effects can explicitly be accounted for. Then the cluster burn-up is simulated by adequate correlation of the burn-up data. The advantage of this method is given by - an exact determination of the real spectrum distribution in the individual fuel element clusters; - an exact determination of the burn-up related spectrum variations for each fuel rod and for each burn-up value obtained; - accounting for heterogeneity of the fuel rod cells and the self-shielding in the fuel; high accuracy of the results of a comparably low effort and - simple handling by largely automating the process of computation. Programed realization was achieved by establishing the RSYST modules ABRAJA, MITHOM, and SIMABB and their implementation within the code system. (Atomindex citation 11:505645)

INIS-mf-5409 PC **A02**/MF **A01**
Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia).
Systems and Programs of Quality Assurance in the Fabrication and Mounting of Nuclear Power Equipment.
L. Kaiser. 1979, 8p CONF-7909126-4
In Hungarian.Atomtechnikai szimpozium, Budapest, Hungary, 11 Sep 1979.
U.S. Sales Only.

The problems of quality assurance and quality control are treated with regard to nuclear safety. A quality assurance program is proposed on the duties from the design to the operation. The duties and responsibility of the designing institutions are emphasized. A quality assurance system is proposed for the organization of the work of the institutions involved in the quality assurance program. (Atomindex citation 11:502859)

INIS-mf-5410 PC **A02**/MF **A01**
Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice (Czechoslovakia).
Study of the Self-Regulating Properties of a WWER Reactor.
J. Filo, J. Trnkusz, and V. Polak. 1979, 11p CONF-7909126-2
In Hungarian.Atomtechnikai szimpozium, Budapest, Hungary, 11 Sep 1979.
U.S. Sales Only.

The results of a self-regulation experiment carried out on the V-1 reactor in Czechoslovakia in the period of the start-up are presented. The kinetic state of the reactor was modified by varying the position of the automatic control rods, the power of the turbogenerators and by switching off a main pump in the primary circuit, on power levels of 35, 55, 75 and 90%. The important thermal parameters of the reactor, the electric power of the turbogenerators, the neutron flux, the position of the automatic control rod group and the concentration of the boric acid in the coolant have been measured. (Atomindex citation 11:502854)

INIS-mf-5435 PC **A02**/MF **A01**
Bremen Univ. (Germany, F.R.).
Atomic Energy in the GDR.
K. Baetier, and J. Scheer. Feb 79, 1p
In German.
U.S. Sales Only.

Short description and critical remarks on safety systems, design basis accidents, waste handling, and licensing procedures for the Novo-Voronesh PWR systems. (Atomindex citation 11:505724)

INIS-mf-5444 PC **A02**/MF **A01**
Verein Deutscher Ingenieure, Duesseldorf (Germany, F.R.). Gesellschaft Energietechnik.
Harrisburg Accident. A Documentation of the VDI-Gesellschaft Energietechnik.
1979, 16p
In German.
U.S. Sales Only.

Based on the fundamentals of PWR technology, an attempt is made to describe the accident in all details and in a generally intelligible way. It is found that all the details of the accident are still not known. (Atomindex citation 11:505812)

Juel-1580 PC **A04**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Sr-90-Release Measurements and Calculations from HTR-Fuel Elements.
W. Amian, M. Helmbold, D. Stoever, K. Wolke, and R. Hecker. Feb 79, 50p
In German.
U.S. Sales Only.

Coated fuel particles were investigated in post irradiation experiments. Sr-90-fractional releases from single particles were measured during isothermal anneals. The time-dependent fractional release curves were analyzed with the aid of simple diffusion theory and delivered temperature dependent diffusion constants. Additionally some measurements were done on kernels with additives and TRISO coated particles. Moreover these data and other data from literature were used in a parametric study to determine the data's influence upon Sr-90 Core releases of 3000 MWsub(th)-plants. The results show, that all calculated forecasts remain sufficiently low as for oxide fuel, but increase to evidently higher release values as for carbide kernel materials. (Atomindex citation 10:470687)

JAERI-M-7711 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Preliminary Analysis of Data for IFA-508(I). II. Diameter Deformation of Fuel Rod; Irradiation Period: June to July, 1977, Attained Burnup: 70 MWd/TUO sub 2.
K. Yanagisawa. Jun 78, 52p
In Japanese.
U.S. Sales Only.

The results are described of irradiation experiments of JAERI's instrumented fuel assembly with HBWR. Presented are the preliminary analysis of cladding diameter variation and data. Irradiation period is covered from June to July 1977, with attained burnups 70 MWd/tUO sub 2 . Obtained results are the following: (1) Wavy deformations of claddings are observed. (2) Physical quantities of RIDGE Dr, SUBRIDGE Ds and TROUGH DIAMETER Dt are defined. (3) RIDGE Dr increases with linear heat rating. Dr, Ds and Dt values depend on fuel gap and thickness of the cladding. (4) The thin clad, small gap fuel rod at a maximum output power (500 W/cm) shows a maximum strain 0.20% of Dr and permanent strain 0.13%. The thick clad, small gap fuel rod at a maximum output power (500 W/cm) shows a maximum strain 0.14% of Dr and permanent strain 0.05%. (5) Dr depends on the rigions of bottom, middle and top of the fuel rod, due significantly to the effect of SUBRIDGE Ds. (6) In the relaxation during high output power holding, there is thickness effect of the cladding. The correspondence between axial and diametral strains is good in the thin cladding, but not in the thick one. Deformation behaviors in axial and diametral directions are similar. (7) Calculation by FEMAXI code agrees well with experiment. (Atomindex citation 10:455907)

JAERI-M-7712 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Prediction of ROSA-III Experiment. RUN 701.
K. Soda. Jun 78, 97p
U.S. Sales Only.

ROSA-III experiment with the simulated BWR system is to investigate thermal hydraulic behavior as well as ECCS performance in a postulated loss-of-coolant accident. RUN 701 assumes average core power, high and low pressure core sprays and low pressure injection of ECCS. Prediction of experiment RUN 701 was made with computer code RELAP-4J. The results indicate the need for ROSA-III pump characteristics to be clarified and for liquid level formation model to be improved. Comparison of the prediction results with the experimental data should reveal the areas of modifications in calculation model. (Atomindex citation 10:430362)

JAERI-M-7716 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Calculation of Stress Intensity Factor at Crack Tip. Preliminary Calculation by FEM and LFM for Analysis of PCI Experiment.
A. Kikuchi, and M. Fujita. Jun 78, 44p
In Japanese.
U.S. Sales Only. Microfiche copies only.

Knowledge of the crack propagation behavior in the Zircaloy cladding is important in analysis of LWR fuel-PCI (pellet-cladding interaction). The most essential is then calculation of the stress intensity factor at crack tip. The region of analysis was set on the transversal cross section of Zircaloy cladding including a crack. The stress distribution under plane stress condition and the stress intensity factor were continuously calculated by finite element method (FEM) and by linear fracture mechanics (LFM) respectively. Described are the calculated results of equivalent stress distribution in the analytical region, nodal displacement at the crack tip, correlation between crack length and energy release rate, correlation between crack length and stress intensity factor, and influence of inner pressure on the stress intensity factor, in the two cases of constant inner pressure and distributed inner pressure. For the next phase of study, useful information could be obtained. (Atomindex citation 10:430730)

JAERI-M-7720 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Computer Code PRECIP-II for the Calculation of Zr-Steam Reaction. Comparison of Calculation and Experiment.
M. Suzuki, S. Kawasaki, and T. Furuta. Jun 78, 101p
In Japanese.
U.S. Sales Only. Microfiche copies only.

The computer code PRECIP-II developed, a modification of S.Malang's SIMTRAN-I, is to calculate Zr-Steam reaction under LOCA conditions. Improved are the following: 1. treatment of boundary conditions at alpha/beta phase interface during temperature decrease. 2. method of time-mesh control. 3. number of input-controllable parameters, and output format. These improvements made possible physically reasonable calculations for an increased number of temperature history patterns, including the cladding temperature excursion assumed during LOCA. Calculations were made along various transient temperature histories, with the parameters so modified as to enable fitting of numerical results of weight gain, oxide thickness and alpha phase thickness in isothermal reactions to the experimental data. Then the computed results were compared with the corresponding experimental values, which revealed that most of the differences lie within +-10%. Slow cooling effect on ductility change of Zircaloy-4 was investigated with some of the oxidized specimens by a ring compression test; the effect is only slight. (Atomindex citation 10:444148)

JAERI-M-7791 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Preliminary Analysis of ROSA-III Experiment. III.
H. Kitaguchi, M. Suzuki, M. Sobajima, and M. Shiba. Aug 78, 122p
In Japanese.
U.S. Sales Only.

Preliminary analysis of ROSA-III experiment has been made with the detailed dimensions fixed, using RELAP-4J code. Effects of the parameters on thermohydraulic behavior of coolant were examined, following on results of the previous analysis. For break conditions, full break at recirculation pump suction was mainly examined, and also other breaks such as in pump discharge-side, main steam line and small break at recirculation pump suction. Following are the conclusions. Water injected into the upper plenum causes condensation-depressurization and the water flowing down to the core decreases. The flow rate in the core should be measured in the ROSA-III test to confirm the predicted phenomena. Effects of the safety-relief valve actuated in small breaks must be considered; measurement of flow rate in the safety-relief line is necessary in ROSA-III test. Analysis with maximum heat flux rods must be made in the future, in addition to the present pre-analysis using average heat flux rods. (Atomindex citation 10:455992)

JAERI-M-7884 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Observation of Stress Concentration by Photoelastic Method. Experiment of PCI Model.
A. Kikuchi, and M. Fujita. Sep 78, 26p
In Japanese.
U.S. Sales Only.

PCI/SCC (Pellet Cladding Interraction/Stress Corrosion Cracking) causes a cladding failure in LWR fuel rods. The analysis of crack propagation whereby the fuel failure occurs involves precise determination of the stress distribution and concentration at the crack tip. For stress analysis of the system with cracks in the cladding, a computer code is being developed in the authors' laboratory. To confirm validity of calculation models in the code, the present experiment has been quite useful. Stress distribution in transparent dummy specimens including cracks were observed directly by photoelastic method. Variety of photoelastic pattern and information acquired are presented. (Atomindex citation 10:470629)

JAERI-M-7917 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
ASCOT-1: A Computer Program for Analyzing the Thermo-Hydraulic Behavior in a PWR Core During a LOCA.
K. Kobayashi, and K. Sato. Sep 78, 53p

U.S. Sales Only.

A digital computer code ASCOT-1 has been developed to analyze the thermo-hydraulic behavior in a PWR core during a loss-of-coolant accident. The core is assumed to be axi-symmetric two-dimensional and the conservation laws are solved by the method of characteristics. For the temperature response of representative fuels of the concentric annular subregions into which the core is divided, the heat conduction equations are solved by the explicit method with the averaged flow conditions decided above. The boundary conditions at the upper and lower plenum are given as inputs. The program is of an adjustable dimension so there are no restrictions to the numbers of meshes. ASCOT-1 is written in FORTRAN-IV for FACOM230-75. (Atomindex citation 10:471183)

JAERI-M-8004 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
ALARM-P1: A Computer Program for Pressurized Water Reactor Blowdown Analysis.
M. Akimoto, F. Araya, S. Sasaki, and K. Sato.
Dec 78, 103p
U.S. Sales Only.

The computer program ALARM-P1 written in FORTRAN-IV for FACOM 230-75 is a part of the code series for evaluation of performance of the emergency core cooling system (ECCS) in pressurized water reactors according to the safety evaluation guidelines provided by the Atomic Energy Commission of Japan. ALARM-P1 is for analyzing the thermo-hydraulic phenomena during blowdown following a large break in the primary coolant system. ALARM-P1 models the PWR system fluid conditions including flow, pressure, mass inventory, fluid quality and heat transfer. It solves integral forms of fluid conservation and state equations for user-defined volumes treated as one-dimensional homogeneous, thermal-equilibrium elements with interconnecting flow paths and also finite difference forms of the one-dimensional heat conduction equations describing temperature profiles within solid material and the fluid-solid interface conditions. In addition, the ALARM-P1 provides the initial conditions for analysis of the last portion of the LOCA transient, a reflood phase, and the information for core heat-up analysis during the whole LOCA. This report describes the state-of-art methods and models of ALARM-P1 in June 1978 and gives information for users. (Atomindex citation 11:497524)

JAPFNR-472 PC **A02**/MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Reactor Physics Activities Relevant to FBR and ATR Programs in PNC, Japan, November 1978-September 1979.
T. Inoue. 1979, 11p PNC-N-241-79-26
Work performed under United States-Japanese Fast Reactor Exchange Program.
U.S. Sales Only.

Reactor physics activities have been performed in PNC, Japan, to support FBR and ATR development programs. The experimental fast reactor JOYO attained the second-stage thermal power of 75 MW in July 1979. Environmental impact of the prototype fast breeder reactor, MONJU, is now being assessed by both Japanese government and prefectural government and its construction will be started in 1981. A prototype reactor of heavy water-moderated, boiling light water-cooled, pressure tube type, FUGEN, went into its commercial operation in March 1979. (ERA citation 05:010060)

JAPFNR-473 PC **A02**/MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Oarai (Japan). Oarai Engineering Center.
Activities in SBL-FPL Loops for Safety Study of LMFBR(I).
Jun 79, 21p PNC-N-941-79-79
Work peformed under USDOE-PNC FBR Information Exchange.
U.S. Sales Only.

As the first step for the safety study of LMFBR, it is necessary to understand the initial events of possible accidents in LMFBR. Local faults and sodium boiling can be considered in that area. SBL and FPL were constructed to understand such phenomena experimentally. Two loops own jointly the dump tank and the purification loop. SIENA is the generic name to both loops. A schematic diagram of SIENA is presented. (ERA citation 05:010144)

JINR-10-11926 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Analog Subsystem for Measuring Static and Dynamic Parameters.
V. A. Gulyaev, L. A. Matalin, G. P. Zhukov, and V. N. Zamrii. 1978, 18p
In Russian.
U.S. Sales Only.

Conditions and distinctive features of the development of an analog subsystem for measuring static and dynamic parameters of experimental nuclear installations are discussed. Characteristics of channels for measurement of analog signals both of low and high levels are considered. Some circuits are analyzed and some essential characteristics of a basic set of CAMAC modules for a noise-immunity analog subsystem are given. This enables one to expand the utilization of data acquisition systems for supervision and control of the installation parameters under conditions of intensive noises. (Atomindex citation 10:470998)

KFK-2600 PC **A99**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Nukleare Sicherheit.
Nuclear Safety Project. Second Semiannual Report, 1977.
May 78, 612p
In German.
U.S. Sales Only.

Individual papers from this report were abstracted and indexed as they were received on the ATOMINDEX tapes for inclusion in the TIC data base. (Atomindex citation 10:425038)

KFK-2656 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente.
Theoretical Investigations of the Gas Flow in Ballooning LWR-Fuel Rods.
I. Gaballah. Sep 78, 15p
In German.
U.S. Sales Only.

A theory is developed for the calculation of gas flow in a fuel rod simulator or in a fuel rod with round or cracked pellets. The fundamental equations are formulated, simplified, reformed, and then numerically solved. The numerical investigations show, that a quasi steady incompressible flow model can be used without great error. The effect of the deformation form is studied. A uniform deformation along the whole length causes small pressure difference. A power profile and rod spacers cause non-uniform clad deformation of the fuel rod simulator or the fuel rod. This deformation leads to greater pressure differences. Finally the effect of the cracked pellets is studied. The cracked pellets cause great pressure differences along the fuel rod. (orig.) 891 HP. (Atomindex citation 10:430271)

KFK-2657 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente.
Contribution to a Theory of Two-Phase Flow with Phase Change and Addition of Heat in a Coolant Channel of a LWR-Fuel Element During a Loss-of-Coolant Accident.
I. Gaballah. Sep 78, 64p
In German.
U.S. Sales Only.

A contribution to a theory of two-phase flow with phase change and addition of heat in a coolant channel of a LWR-fuel element during a loss-of-coolant accident. A theory was developed for the calculation of a dispersed two phase flow with heat addition in a channel with general area change. The theory was used to study different thermodynamic and gasdynamic processes, which may occur during the emergency cooling after a LOCA of a pressurized water reactor. The basic equations were formulated and solved numerically. The heat transfer mechanism was examined. Calculations have indicated that the radiative heat flux component is small compared to the convective component. A drop size spectrum was used in the calculations. Its effect on the heat transfer was investigated. It was found that the calculation with a mean drop diameter gives good results. Significant thermal non-equilibrium has been evaluated. The effect of different operating parameters on the degree of thermal non-equilibrium was studied. The flow and heat transfer in a channel with cross-sectional area change were calculated. It was shown that the channel deformation affects the state properties and the heat transfer along the channel very strongly. (orig.) 891 GL. (Atomindex citation 10:430469)

KFK-2674 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
EIE, KfK Joint Heat Transfer Experiment on a Single Rod, Roughened with Trapezoidal Rounded Ribs and Cooled by Various Gases.
M. D. Donne, M. Hudina, M. Huggenberger, L. Meyer, and K. Rehme. Oct 78, 86p
U.S. Sales Only.

Heat transfer and pressure drop experiments with an identical fuel rod simulator have been performed at the two Research Establishments in Wuerenlingen and in Karlsruhe. The rod was artificially roughened with two-dimensional ribs of trapezoidal shape and with rounded edges. The experiments at EIR were performed with CO sub 2 and the rough rod was contained in a smooth tube and centered by special spacers. The experiments at KfK were performed using helium and nitrogen in the same test section (rod and outer smooth tube with spacers) and air with the rod mounted in another outer smooth tube and with spacers located farther away from the measuring positions. The global measured friction factors and Stanton numbers for different gases agree reasonably well. (ERA citation 04:046469)

KFK-2700 PC **A99**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Nukleare Sicherheit.
Nuclear Safety Project. First Semiannual Report 1978.
Nov 78, 601p
In German, English.
U.S. Sales Only.

The 13th semi-annual report 1/78 is a description of work within the Nuclear Safety Project performed in the first six months of 1978 in the nuclear safety field by KFK institutes and departments and by external institutions on behalf of KfK. It includes for each individual research activity short summaries on - work completed, - essential results, - plans for the near future. (Atomindex citation 10:469929)

KFK-2703 PC **A22**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. fuer Angewandte Systemanalyse.
Consequences of Large-Scale Implementation of Nuclear Energy in the Federal Republic of Germany. Economic Problems of the Large-Scale Implementation of Nuclear Energy in the Federal Republic of Germany.
D. Brune, R. Coenen, F. Conrad, S. Klein, and H. Paschen. Feb 79, 501p ASA/ZE-12-78
In German.
U.S. Sales Only.

In this part of the study, selected questions concerning the economic aspects of the large-scale implementation of nuclear energy are discussed. First, the future contribution of nuclear energy toward covering total expected energy demand is defined within the framework of model projections designed with a view to fulfilling important overall economic goals. A comparison of these model projections with the present situation reveals discrepancies which might, in the case of prolonged delays, result in shortages of electricity supply in the mid-eighties. The potential impacts of such delays, especially with regard to the situation on the labour market, as well as strategies to avoid difficulties in the supply of electricity, are analyzed. This analysis is followed by a comparison of the costs of electricity generation by coal-fired and nuclear power plants and by an analysis of the problem of financing the further implementation of nu-

clear energy. In a final chapter, the importance of the export of nuclear power plants for the German nuclear industry and for the economy as a whole is discussed. (Atomindex citation 10:471096)

KFK-2775 PC **A11**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. Strahlenschutz und Sicherheit.
1978 Annual Report of the Safety Department.
H. Kiefer, and W. Koelzer. Apr 79, 238p
In German.
U.S. Sales Only.

The Safety Officer and the Security Officer, respectively, are responsible for radiation protection and technical safety, both conventional and nuclear, for the physical protection as well as the security of nuclear materials and radioactive substances within the Kernforschungszentrum Karlsruhe GmbH. (KfK). To fulfill these functions they rely on the assitance of the Safety Department. The duties of this Department cover tasks relative to radiation protection, safety and security on behalf of the institutes and departments of KfK and environmental monitoring for the whole Karlsruhe Nuclear Research Center as well as research and development work, mainly performed under the Nuclear Safety Project and the Nuclear Safeguards Project. The centers of interest of r and d activities are: investigation of the atmospheric diffusion of nuclear pollutants on the micro- and meso-scales, evaluation of the radiological consequences of accidents in reactors under probabilistic aspects, studies of the physical and chemical behavior of radionuclides with particularly high biological effectiveness in the environment, implementation of nuclear fuel safeguarding systems, improvements in radiation protection measurement technology. This report gives details of the different duties, indicates the results of 1978 routine tasks, and reports about new results of investigations and developments of the working groups of the Department. (Atomindex citation 10:476693)

KFK-2790 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
True Mass Flowmeter. Development and Use of a Mass Flow Measuring Instrument for Non-Steady-State Two-Phase Flows.
G. Class, K. Hain, F. Schloss, and K. H. Wagner. Jul 79, 76p
In German.
U.S. Sales Only.

A pressure and temperature resistant measuring instrument is described for measurements of a transient water/vapor two-phase mass flow under PWR operating conditions. The measuring instrument, termed 'True Mass Flow Meter', is capable of measuring the mass flow in a direct way and independent of the state of the medium. The operating data of 160 bar and 573 K correspond to the PWR conditions; the measuring range extends to 5 kg/s. The accuracy of measurement achieved is better than +- 3%. This report deals with the concept and design of the TMFM and with its operating behavior during the blowdown test performed in COSIMA. (Atomindex citation 11:497388)

KFK-2810 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung.
Investigations into the Temperature-Transient Steam Oxidation of Zircaloy 4 Cladding Material under Hypothetical PWR-Loss-of-Coolant Accident Conditions.
S. Leistikow, G. Schanz, and H. von Berg. Apr 79, 61p
In German.
U.S. Sales Only.

The temperature-transient steam oxidation has been investigated by exposure to steam of inductively heated tube sections under realistic and pessimistic assumptions about the hypothetical accident at temperatures up to 1200 exp 0 C and durations of 3 min or less. Thus, a variety of complete and partial LOCA-transients could be simulated in a simplified shape of their time-temperature sequences and evaluated with respect to the extent of oxidative attack. In principle, also under temperature-transient conditions, the oxygen uptake was determined mainly by temperature and time. In all cases and due to the reduced time-at-temperature, the extent of transient oxidation was lower than under comparable isothermal conditions. The agreement of calculated and experimental results was acceptable. Deviations from this kind of predictable LOCA oxidation behaviour were found in many cases during exposure of metallic or preoxidized material. Essentially, they are related to the phase transformations of the oxide and metal lattice during the temperature transients and to changes in the oxidation rate determining defect structure. Thus, anomalous effects, as higher or lower extent of oxidation, are observed. The gravimetric results are complemented by metallographic evaluations, which concentrate also on the local pattern of oxidative attack. (Atomindex citation 10:477237)

KFKI-1977-108 PC **A03**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Experimental High Pressure Water Loops Pt. 1. General Description.
L. Szabados, T. Beszeda, V. Csom, L. Maroti, and P. Windberg. Jan 78, 35p
In Hungarian.
U.S. Sales Only.

The loop was erected for the investigation of thermohydraulic processes in water-cooled power reactors. The main parameters of the loop and the constructional details of the different units as well as their role are described. The present status with six parallel test sections for different experiments is presented. The layout of the test sections in use and their constructional details are shown in some examples. (Atomindex citation 10:430649)

KFKI-1977-115 PC **A03**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Steady State and Transient Critical Heat Flux Examinations.
L. Szabados. Feb 78, 39p
In Hungarian.
U.S. Sales Only.

In steady state conditions within the P.W.R. parameter range the critical heat flux correlations based on local parameters reproduce the experimental data with less deviations than those based on system parameters. The transient experiments were restricted for the case of power transients. A data processing method for critical heat flux measurements has been developed and the applicability of quasi steady state calculation has been verified. (Atomindex citation 10:430650)

KFKI-1978-50 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Modification of the Subcooled Boiling Calculation in the COBRA-3/KFKI Program.
T. Katona, and L. Szbotinov. Jun 78, 18p
In Russian.
U.S. Sales Only.

Modification of the subcooled boiling calculation based on the Lewy model in the COBRA-3/KFKI program is reported. The background of the modification is the Subotinov which was verified for different axial heat flux-distributions with gamma-void measurements in the parameter range of PWR reactors. The model is based on a heat balance, considering the non-equilibrium characteristic of subcooled boiling. The void fraction is calculated with the help of slip, determined from local average parameters. (Atomindex citation 10:471182)

KIYI-77-14 MF **A01**
AN Ukrainskoj SSR, Kiev. Inst. Teoreticheskoj Fiziki.
Neutron Flux Dependence on the Fuel Concentration in Fuel Elements of the WWR-M-Kiev Reactor Core.
N. S. Ozimai, and N. C. Sumets. 1977, 19p
In Russian.
U.S. Sales Only. Microfiche copies only.

The flux density space distribution of the thermal neutrons and neutrons with E > Esub(eff) exp 232 Th was measured for different fuel distributions in the reactor core radius by the KNT-4 fission chamber. The flux density of the thermal neutrons and neutrons with E > Esub(eff) exp 232 Th was also measured in the reactor core center at the constant fuel concentration. The maximum of the fast neutron flux density is found to be in approximately 20% burnup zone. The optimum reloading of the reactor core is recommended to create the maximum flux of thermal and fast neutrons on the WWR-M reactor core boundary. (Atomindex citation 10:438102)

NP-23802 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Probabilistic Analysis of the Cost for Surface-Sited and Underground Nuclear Power Plants.
K. Terasawa, R. O'Toole, and M. Goldsmith. Mar 78, 77p

The study reported in this document addresses the comparative costs of surface and underground nuclear power plants. The analysis considers the possible uncertainities associated with nuclear power plant construction, and thus is a supplement to the cost estimates prepared by the engineering firms. Because the method requires a considerable level of detail in the engineering cost estimates which form the basic data input, information beyond that usually supplied with conceptual designs is necessary. In the present study, only with the berm plant estimates were examined in detail, thus the present report treats only with the berm design. The method is equally applicable to the mined cavity concept, however. (ERA citation 04:046541)

NUREG/CR-1009 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Reactor Safety Research Programs.
Quarterly rept. 1 Jul-30 Sep 79,
J. L. Hooper. Mar 80, 158p PNL-3040-3
Contract DOE-EY-76-C-06-1830
See also report for Apr-Jun 79, NUREG/CR-0962.

Contents:
- Ultimate heat sink performance measurement;
- Experimental verification of steady state codes--task A - irradiation results;
- Experimental verification of steady state codes--task C - code development;
- Graphite nondestructive testing;
- Acoustic emission-flaw relationship for in-service monitoring of nuclear pressure vessels;
- Fuel subassembly procurement and irradiation test program;
- Resident engineer at Cadarrache, France;
- Core thermal model development;
- Integration of nondestructive examination reliability and fracture mechanics;
- Steam generator tube integrity.

NUREG/CR-1237 PC **A08**/MF **A01**
Sandia Labs., Albuquerque, NM.
Best-Estimate LOCA (Loss-of-Coolant Accident) Radiation Signature,
Lloyd L. Bonzon, and Norman A. Lurie. Jun 80, 161p SAND-79-2143
Prepared in cooperation with IRT Corp., San Diego, CA.

The principle objective of the study was to detail the 'best estimate' of the time progressive accident radiation releases into the containment building. This study considers an unterminated LOCA condition as the basis for the calculations. The work is significant in that it represents a conservative, but realistic, best estimate of the resultant radiation signature. The effects of the uncertainties in the release fractions as well as variations in the time dependence of the releases were investigated; as might be expected, there is a wide uncertainty band on the best-estimate releases. Section 6 of the Part III report summarizes specific conclusions developed in the course of the study.

NUREG/CR-1396 PC **A06**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Prompt Burst Energetics Experiments: Fresh Uranium Carbide/Sodium Series,
K. O. Reil, M. F. Young, H. Jacobs, and H. Plitz. May 80, 124p SAND-80-0820
Prepared in cooperation with Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.).

The present program has as its objectives the determination of the phenomena which dominate in

the conversion of thermal energy to work, development of models to accurately predict the energetics associated with such hypothetical accidents, and provision of the required input data for those models. The current program in Prompt Burst Energetics (PBE) at Sandia Laboratories involves an in-pile experimental and complementary analytical investigation of the energetics of fuel-clad-coolant systems subjected to energy deposition conditions associated with super-prompt critical excursions. In particular, the emphasis to date has been on autoclave tests of single intact fuel pins in the presence of stagnant sodium irradiated in the experiment cavity of the Annular Core Pulse Reactor (ACPR) and on the supportive analysis of those tests.

NUREG/CR-1440 PC **A10**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Light Water Reactor Status Monitoring during Accident Conditions.
Interim research rept. Nov 79-May 80,
J. von Herrmann, R. Brown, and A. Tome. Jun 80, 209p EGG-EA-5153
Prepared in cooperation with Science Applications, Inc., Palo Alto, CA.

A novel technical approach for systematically determining information needs during reactor accidents is proposed. The method is used to identify the necessary and sufficient set of Light Water Reactor instrumentation by analyzing the appropriate operator response to specific plant states associated with risk significant accident sequences. The resultant set of measurable parameters is compared to the list of such parameters in Regulatory Guide 1.97, 'Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During the Following an Accident.'

NUREG/CR-1483 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Quarterly Progress Report on Blowdown Heat Transfer Separate-Effects Program for January-March 1980,
W. G. Craddick, T. M. Anklam, C. R. Hyman, R. E. Bohanan, and G. S. Mailen. Jun 80, 19p
ORNL/NUREG/TM-394
Contract W-7405-eng-26
See also report for Jul-Sep 79, NUREG/CR-1121.

Six additional bundle uncovery/recovery tests were performed in the Thermal-Hydraulic Test Facility during January, bringing the total number of these tests to eight. Data taken during the tests were found to be contaminated by numerous spurious spikes. Work to remove the spurious spikes is under way. Posttest analysis of the tests is approximately 20% completed. The recovery portion of one of the tests will be analyzed by COBRA/TRAC, currently being developed by Pacific Northwest Laboratories (PNL). Work to debug the code for this application is in progress at PNL. Design, procurement, and fabrication of the in-bundle gamma densitometer system are continuing on schedule.

NUREG/CR-1504 PC **A06**/MF **A01**
Argonne National Lab., IL.
A User's Guide to EPIC, a Computer Program to Calculate the Motion of Fuel and Coolant Subsequent to Pin Failure in an LMFBR,
P. A. Pizzica, P. L. Garner, and P. B. Abramson. Jul 80, 118p ANL-80-47

The computer code EPIC models fuel and coolant motion which results from internal fuel pin pressure (from fission gas or fuel vapor) and possibly from the generation of sodium vapor pressure in the coolant channel subsequent to pin failure in a liquid-metal fast breeder reactor. The EPIC model is restricted to conditions where fuel pin geometry is generally preserved and is not intended to treat the total disruption of the pin structure. The modeling includes the ejection of molten fuel from the pin into a coolant channel with any amount of voiding through a clad breach which may be of any length or which may extend with time. One-dimensional Eulerian hydrodynamics is used to treat the motion of fuel and fission gas inside a molten fuel cavity in the fuel pin coolant channel. Motion of fuel in the coolant channel is tracked with a type of particle-in-cell technique. EPIC is a Fortran-IV program requiring 400K bytes of storage on the IBM 370/195 computer.

NUREG/CR-1520 PC **A08**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Experiment Data Report for LOFT Anticipated Transient Experiment L6-5,
Benjamin D. Stitt, and Janice M. Carpenter. Jul 80, 157p EGG-2045
Contract DE-AC07-76IDO1570

The report presents experimental data from the first anticipated transient experiment (Experiment L6-5) conducted in the Loss-of-Fluid Test (LOFT) facility. The data are uninterpreted but readily usable for the nuclear community in advance of detailed analysis and interpretation Experiment L6-5 was a loss of secondary feed-water anticipated transient, and was performed on May 29, 1980, as part of the LOFT Experimental Program conducted by EG&G Idaho, Inc., for the U.S. Nuclear Regulatory Commission. This experiment is part of the LOFT Non-LOCE Test Series 16 which was designed to provide data for investigating the thermal-hydraulic response of the LOFT reactor system for transient initiation to plant restabilization after reactor scram.

NUREG/CR-1526-V-1 PC **A03**/MF **A01**
Argonne National Lab., IL.
Physics of Reactor Safety.
Quarterly rept. Jan-Mar 80.
Jul 80, 43p ANL-80-54-VOL-1
See also report dated May 80, NUREG/CR-1371.

The Quarterly progress report summarizes work done during the months of January-March 1980 in Argonne National Laboratory's Applied Physics and Components Technology Divisions for the Division of Reactor Safety Research. The work in the Applied Physics Division includes reports on reactor safety modeling and assessment by members of the Reactor Safety Appraisals Section. Work on reactor core thermal-hydraulics is performed in ANL's Components Technology Division, emphasizing 3-dimensional code development for LMFBR accidents under natural convection conditions. An executive summary is provided including a statement of the findings and recommendations of the report.

NUREG/CR-1557 PC **A06**/MF **A01**
Battelle Columbus Labs., OH.
Steam-Water Mixing and System Hydrodynamics Program.
Quarterly progress rept. on Task 4, 1 Apr-30 Jun 79,
Robert P. Collier, Thomas A. Bishop, Joseph A. Dworak, Lawrence J. Flanigan, and Robert E. Kurth. Jul 80, 117p BMI-2038
See also report dated Jun 79, NUREG/CR-0897.

During this quarter, analysis included additional development of the I star scaling parameter for tubes, review of results from air-water tests in distorted geometries, and correlation of results from counter current flow condensation tests in a rectangular test section. Experimental work this quater included completion of condensation tests and heat partitioning studies in the rectangular test section, and air-water and steam-water tests in the 2/15-scale model with shortened and extended annulus lengths.

ORNL/TM-7150 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
ACFAC: A Cash Flow Analysis Code for Estimating Product Price from an Industrial Operation.
J. G. Delene. Apr 80, 55p
Contract W-7405-ENG-26

A computer code is presented which uses a discountted cash flow methodology to obtain an average product price for an industrial process. The general discounted cash flow method is discussed. Special code options include multiple treatments of interest during construction and other preoperational costs, investment tax credits, and different methods for tax depreciation of capital assets. Two options for allocating the cost of plant decommissioning are available. The FORTRAN code listing and the computer output for a sample problem are included. (ERA citation 05:024069)

PNL-2667 MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Impact of Pellet-Cladding Interaction on Fuel Integrity: A Status Report.
P. J. Pankaskie. Feb 78, 34p
Contract EY-76-C-06-1830
Microfiche copies only.

There appears to be a general consensus that pellet/cladding interaction (PCI) is one of the principal limitations on reactor core power cycling. The economic importance of PCI, as fuel service limiting, is evidenced by the fact that all USLWR fuel suppliers impose some operating restrictions and/or recommendations on rates and magnitudes of power increases for both startup and demand load response modes of operation. In contrast to the economic aspects of PCI, there does not appear to be a similar attitude with regard to the safety significance of PCI in operating USLWRs. The apparent incidence of PCI failures accompanying a transient increase in core/rod power, however, provides a basis for some system safety conern. The predominant role of the economics of PCI failures has led to the individual development, by USLWR fuel suppliers, of specific operating recommendations for minimization of PCI fuel failures under more or less normal operation. (ERA citation 04:030009)

RE-A-78-261(Rev.2) PC **A10**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Analysis Tool for Predicting Transient Hydrodynamics in Nuclear Piping Systems Containing Swing Check Valves.
R. A. Berry. Sep 79, 222p
Contract EY-76-C-07-1570

An analysis tool is constructed for the purpose of predicting the fluid transient in a piping system as a consequence of (or in site of) a check valve being present in the system. The development of the check valve model along with its implementation into a fluid flow analysis computer program is documented. The analysis tool requirements are outlined and the valve flow and disk dynamics are established. A sample demonstration problem was run using the analysis tool and the results reported. Several supporting documents for the transient fluid flow analysis computer program are also included in the appendices. (ERA citation 05:003071)

RE-A-79-013 PC **E07**/MF **E01**
Idaho National Engineering Lab., Idaho Falls.
Analytical Procedure for Performing Structural Analysis of Nuclear Piping Systems Subjected to Fluid Transients.
D. K. Morton. Feb 79, 160p
Contract EY-76-C-07-1570

An analytical procedure is formulated for the purpose of predicting the structural consequences of various fluid transients in nuclear piping systems. For demonstration purposes, this procedure is utilized to structurally analyze two representative nuclear piping systems subjected to different fluid transients. All procedure details and demonstration problem results are included in the appendices. (ERA citation 05:005781)

RE-A-79-044 PC **A06**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
State-of-the-Art Literature Review of Water Hammer.
J. C. Watkins, and R. A. Berry. Apr 79, 116p
Contract EY-76-C-07-1570

A state-of-the art review of literature pertinent to fluid transients (water hammer) was undertaken for the Nuclear Regulatory Commission. This review is part of the ongoing water hammer studies being performed by EG and G Idaho, Inc., to further the understanding of the water hammer phenomenon, to more accurately identify its causes and to more accurately predict its effects. A scenario of various fluid transients is presented, followed by a review of research and testing of various phenomena wich affect the severity of the transient. Finally, numerical simulation techniques of such transients as well as numerous computer codes which could be applied to such transients, are discussed. (ERA citation 05:005782)

RHO-SA-103 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.

Summary of the Development of a Cost/Risk/ Benefit Analysis for the Decontamination and Decommissioning of the Hanford Z-Plant.
R. A. Sexton, and J. P. Melvin. 10 Sep 79, 17p CONF-790923-7
Contract EY-77-C-06-1030
Decontamination and decommissioning of nuclear facilities conference, Sun Valley, ID, USA, 16 Sep 1979.

Various possibilities are considered for the decontamination and decommissioning of Hanford's Z-Plant plutonium processing facility in a cost/risk/ benefit analysis. The four end points of unrestricted, conditional, restricted area with use and restricted area with non use are defined and the criteria and methods of analysis are described. (ERA citation 04:056146)

SAND-78-1906C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Full Scale Turbine--Missile Casing Exit Tests.
H. R. Yoshimura, J. T. Schamaun, and G. E. Sliter. 1979, 11p CONF-790802-24
Contract EY-76-C-04-0789
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

Two full-scale tests have simulated the impact of a fragment from a failed turbine disk upon the steel casing of a low-pressure steam turbine with the objective of providing data for making more realistic assessments of turbine missile effects for nuclear power plant designers. Data were obtained on both the energy-absorbing mechanisms of the impact process and the post-impact trajectory of the fragment. In both tests the target structure was a simplified model of a casing. The two main semicircular casing components that are expected to absorb most of the energy in a postulated failure were modeled: the internal blade ring which supports the stationary turbine blades (represented by a 12.7-cm-thick steel ring) and the outer casing cover (represented by a 3.2-cm-thick steel shell). The tests demonstrated that turbine casings can absorb substantial amounts of energy in slowing down or containing fragments from a postulated turbine failure. Additional testing and analysis are needed to quantify the energy that can be dissipated over a full range of impact conditions and to examine the possible mitigating effects of fragment rotation and off-normal orientation on subsequent impacts on outer concrete walls of power plants. (ERA citation 04:044862)

SAND-79-1325C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Dispersion Parameters: Impact on Calculated Reactor Accident Consequences.
D. C. Aldrich. 1979, 6p CONF-791103-12
Contract EY-76-C-04-0789
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

Much attention has been given in recent years to the modeling of the atmospheric dispersion of pollutants released from a point source. Numerous recommendations have been made concerning the choice of appropriate dispersion parameters. A series of calculations has been performed to determine the impact of these recommendations on the calculated consequences of large reactor accidents. Results are presented and compared in this paper. (ERA citation 04:054857)

SAND-79-1534 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Optimal Improvement of Networks to Nuclear Safeguards Problems: An Alternate View.
P. J. Slater. Aug 79, 15p
Contract EY-76-C-04-0789

Networks have been used to model fixed-site security systems and to determine optimal travel routes of thieves or saboteurs. Considered here is the problem of upgrading the security by optimally investing in means to increase the travel time and/ or detection probabilities over the arcs of the network. It is shown how to formulate a single linear programming problem to answer the following question. If the cost of increasing travel time is linear for each arc, what is the minimum amount of money one must invest to guarantee that there does not exist a path for thief or saboteur of length less than a fixed time T. (ERA citation 05:002694)

SAND-79-1733C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Model and Computer Code for Energy and Mass Transport in Decomposing Concrete and Related Materials.
R. L. Knight, and J. V. Beck. 1979, 6p CONF-790816-54
Contract EY-76-C-04-0789
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

In an HCDA, it is postulated that liquid metal coolents and more materials come in contact with the rotaining concrete structure. A mathematical model and an associated computer program have been developed to describe the transient heat and mass transfer in the concrete. The program is unique in that it includes: (1) chemical reactions involving free water, chemically bound water and CO sub 2 ; (2) an implicit calculational procedure; and (3) change of the porosity as the concrete is decomposed. Predictions of the model are compared with experimental results obtained at Sandia Laboratories and at Hanford Engineering Development Laboratory. (ERA citation 05:003073)

SAND-79-1962C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Statistical Analysis of the Blowdown Phase of a Loss-of-Coolant Accident in a Pressurized Water Reactor as Calculated by RELAP4/ MOD6.
M. Berman, R. K. Byers, and G. P. Steck. 1979, 44p CONF-791118-2
Contract EY-76-C-04-0789
Water reactor safety research information meeting, Gaithersburg, MD, USA, 5 Nov 1979.

A statistical study is presented of the blowdown phase of a design basis accident (double-ended cold leg guillotine break) in the Zion pressurized water reactor. The response surface method was employed to generate a polynomial approximation of the peak clad temperatures calculated by RELAP4/MOD6. The nodalization was a modification of the RELAP model of Zion developed in the BE/EM study. Twenty one variables were initially selected for the study. These variables, their ranges and distributions resulted from the best engineering judgement of NRC, Sandia, INFL, and other interested and knowledgeable investigators. (ERA citation 05:001091)

SAND-79-1963C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Two-Phase Jet Loads.
D. Tomasko. 1979, 26p CONF-791118-1
Contract EY-76-C-04-0789
Water reactor safety research information meeting, Gaithersburg, MD, USA, 5 Nov 1979.

The ultimate objective of the Sandia Labs Program on two-phase jet loads is to develop an approximate engineering model characterizing two-phase jets emanating from circumferential or longitudinal breaks in a typical PWR piping system. Most of the work performed to date has focused on this second task. Three computer codes have been employed to investigate jet load experiments in detail. There are: BEACON/MOD2-INEL; CSQ - Sandia Labs; and TRAC-P1A - LASL. (ERA citation 05:003074)

SERI/TP-51-177 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Advanced Technology and Public Policy: The Development of the Nuclear Power Reactor in Six Nations.
P. deLeon. Feb 79, 38p
Contract EG-77-C-01-4042

An analysis of how political, social, and economic forces shaped the development of nuclear power in the US, USSR, Great Britain, France, Canada, and West Germany is presented. (ERA citation 05:004506)

SGAE-2820 PC **A03**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Principles of Measurement and of Safety Surveillance for the PCPV/Helium-Loop.
H. Zemann. Oct 77, 39p RS-120/77
In German.
U.S. Sales Only.

The operating conditions of the PCVP/Helium-Loop are surveyed by gauges within the structural concrete, inside the vessel and at the auxiliary equipment. Data are compared by the operator to the limits given by design and material properties. Under continuous operation the PCPV will be surveyed by an automatic safety system which will be able to detect the arise of unsafe operating conditions and initiate preventive reactions. (Atomindex citation 09:414775)

SRD-R-159 PC **A09**/MF **A01**
UKAEA Safety and Reliability Directorate, Culcheth (England).
Effect of Uncertainties in Thermophysical Properties of UO sub 2 and Sodium on MFCI's.
D. A. MacInnes, D. Martin, and G. J. Vaughan. Jul 79, 13p
Work performed under United States-UKAEA Fast Reactor Exchange Program.
U.S. Sales Only.

Recent work has led to the values of the physical properties of molten UO sub 2 and sodium to be questioned. The effect of these uncertainties on MFCI's is investigated - in particular, how the interface temperature/spontaneous nucleation temperature criterion for an interaction to occur and its yield are changed. It is concluded that it is not possible to exclude MFCI's between UO sub 2 and sodium by this criterion given the present uncertainties. (ERA citation 05:003075)

STUDSVIK-BL-78-3 PC **A03**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Fission Product Migration in Intact Fuel Rods. S176 Experiments 1-5: Gamma Spectrometric and beta Autoradiography Results on Radial Fission Product Distribution.
W. Blackadder, R. Forsyth, K. Malen, and Bengt-Aake Nilsson. Mar 78, 31p
U.S. Sales Only.

This report is the third of a group which present the results obtained during the first 5 experiments in the S176 series of irradiation experiments. The aim of this series is to provide information on the distribution of fission products in intact irradiated fuel rods, both within the UO sub 2 , fuel and on the inside of the Zircaloy clad. Fuel rods, previously irradiated to appreciable burnups in the Aagesta R3 reactor, after cooling, are reirradiated in the Studsvik R2 test reactor for short periods to build up significant inventories of short-lived fission products of interest. The irradiation conditions are well defined. Examination of sections of fuel and clad within a short time after removal from the reactor is performed by means of high-resolution Ge(Li) gamma spectrometry. The fuel sections are also examined metallographically to determine fuel structure, and by beta autoradiography. (Atomindex citation 10:433643)

STUDSVIK/K1/4-78/9 PC **A02**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Handling of alpha Active Material.
G. Berggren. Oct 78, 22p
In Swedish.
U.S. Sales Only.

The handling of alpha active material involves many problems. Some of these are discussed in this report particularly those concerning monitoring and ventilation. The report summarizes the experiences from the handling of Pu in boxes at Studsvik, Sweden. (Atomindex citation 10:480830)

STUDSVIK-RL-78-47 PC **A02**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Electrically Heated Fuelrod Simulator.
G. Dillner. May 78, 9p
In Swedish.
U.S. Sales Only.

The rod is direct-heated, and conceived for experiments to measure heat transfer at the post-dryout phase after blowdown, until start of the sprinklers. (Atomindex citation 10:430678)

TFBP-TR-315 PC **A05**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
PBF/LOFT Lead Rod Program Tests LLR-3, -4, -5 Quick Look Report.
D. J. Varacalle, Jr., and R. W. Garner. Apr 79, 97p

Contract EY-76-C-07-1570

The preliminary results are presented of the PBF/LOFT Lead Rod (LLR) Program Tests LLR-3, LLR-4, and LLR-5 conducted in the Power Burst Facility Test Reactor in the Idaho National Engineering Laboratory. Test LLR-3 was conducted on February 28, 1979; Test LLR-5 was conducted on March 24, 1979; and Test LLR-4 was conducted on March 30, 1979. The PBF/LLR Tests were designed to simulate the test conditions for LOFT loss-of-coolant experiments (LOCEs) tests L2-3 through L2-5. (ERA citation 04:051712)

TID-29009 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Core Test Program: UWNR Mixed TRIGA-FLIP Core.
R. J. Cashwell. Feb 78, 32p
Contract EY-76-C-02-1560

Six new FLIP fuel bundles (Nos. 43 through 48) and one standard instrumented element were received on December 28, 1977. Normal fuel element measurements were performed on the new FLIP fuel bundles and the instrumented fuel element was prepared for service by attaching conduit and connecting thermocouple leads to an appropriate connector. A loading to critical was begun on December 20, 1977, and completed on January 3, 1978. Initial criticality was reached at 1340 on January 3, 1978, with 19 fuel bundles in the core and control rods banked at 15.12 inches withdrawn. Shutdown margin of the 19-bundle critical core was measured to be 7.8% reactivity. (ERA citation 04:030174)

UCID-18135-79-1 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
US NRC/LLL Liaison with the Federal Republic of Germany for the GKSS-PSS Steam Condensation Tests. Progress Report No. 1.
E. W. McCauley. 25 Jun 79, 76p
Contract W-7405-ENG-48

This progress report for the USNRC/LLL Liaison program with the Federal Republic of Germany regarding boiling water reactor containment multivent steam condensation tests being conducted by GKSS (Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt) address program activity during the period of May-June 1979. During this period the program scope was defined, initial contacts between LLL and GKSS were established, and the first trip by an LLL representative to the GKSS test facility was taken. (ERA citation 05:003076)

UCID-18135-79-2 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
US NRC/LLL Liaison with the Federal Republic of Germany for the GKSS-PSS Steam Condensation Tests. Progress Report No. 2.
G. S. Holman. 13 Sep 79, 11p
Contract W-7405-ENG-48

This second progress report for the USNRC/LLL liaison program with the Federal Republic of Germany regarding boiling water reactor containment multivent steam condensation tests being conducted by GKSS addresses program activity during the period of July-August, 1979. During this period, the first digital data, video tapes, and complete report for test VM1 were received, together with various computer software used by GKSS for data reduction. Document handling procedures were finalized in order to protect the proprietary nature of informaion received from GKSS and several translations were obtained. (ERA citation 05:005784)

UCID-18138 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Technical Evaluation of the Alternate to the Keylock Control to the Bypass Valves for the Davis-Besse Nuclear Power Plant, Unit 1.
J. G. Ibarra. Sep 79, 13p
Contract W-7405-ENG-48

This report documents the technical evaluation of the alternate to the keylock control to the bypass valves for the Davis-Besse nuclear power plant, Unit 1. The review criteria are inferred from the NRC Reactor Safety Study (WASH-1400) and the Safety Evaluation Report for Davis-Besse. This report is supplied as part of the Selected Electrical, Instrumentation, and Control Systems Issues Program being conducted for the US Nuclear Regulatory Commission by Lawrence Livermore Laboratory. (ERA citation 05:010053)

UCID-18271 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Application of Time Domain PARET to the Measured Responses of a Building.
D. L. Lager. 18 Sep 79, 19p
Contract W-7405-ENG-48

The application of the Time Domain PARET (TDP) algorithm to data obtained from the measured responses of a three story reinforced concrete building approximately 465 feet long by 220 feet wide by 40 feet high, with 12 to 18 inch thick walls, is described. The measurements were taken by Agbabian Associates, El Segundo, California. The structure was excited by a device developed at Agbabian that uses a mass sliding down a rod to cut metal disks attached to the rod. The result is a series of impulse forces driving the building at the attachment point of the rod. The responses measured were the accelerations at two locations on the structure. A constraint imposed was that the equipment in the building must remain operating during the time the measurements were made. (ERA citation 05:001093)

UCRL-15077 PC **A03**/MF **A01**
TERA Corp., Berkeley, CA.
Seismic Risk Analysis for Battelle Memorial Institute Nuclear Research Facility, West Jefferson, Ohio.
29 Dec 78, 42p
Contract W-7405-ENG-48

TERA Corporation presents the results of a detailed seismic risk analysis of the Battelle Memorial Institute's Nuclear Research Facility at West Jefferson, Ohio. This report focuses on earthquakes. (ERA citation 05:003077)

UCRL-15090 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
MARS Vessel Safety Analysis. LATA Report No. 115.
L. D. Rigdon, B. J. Donham, and P. S. Hughes.
Aug 79, 82p
Contract W-7405-ENG-48

A previous study was performed to assess the hazards associated with an accidental leakage of cooling water into the crucible of molten exp 238 U for the MARS laser isotope separation experiment. Since that study found that the probability of such an explosion is extremely low during an accidental cooling system failure, a study was conducted to define a more realistic design basis accident (DBA) for the final MARS configuration. If the vapor-phase explosion is considered to be a significant threat, the design criteria for the vacuum vessel should be a working pressure of 67 psig or 101 psig momentary single pulse equivalent static pressure. (ERA citation 05:000215)

UCRL-82227 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Operator/Instrumentation Interactions During the Three Mile Island Incident.
G. E. Cummings. Oct 79, 4p CONF-791060-1
Contract W-7405-ENG-48
IEEE symposium on nuclear power systems, San Jose, CA, USA, 19 Oct 1979.

A discussion is presented of the operator/instrumentation interactions which had an effect on the course of the incident at the Three Mile Island-2 Nuclear Power Plant. A brief review of the sequence of occurrences at TMI-2 over the first 16 hours of the incident is given with particular emphasis on operator/instrumentation interactions. A breakdown of the six major items that seemed to have contributed to the characteristics of the incident is then given and also an outline of some of the currently proposed operator/instrumentation improvements. The six major items involve water level indication in the reactor, electromatic relief valve operation, auxiliary feed-water flow indication, containment isolation, extended range instrumentation, and computer readout. (ERA citation 05:003079)

UNI-M-90(V.1) PC **A19**/MF **A01**
United Nuclear Industries, Inc., Richland, WA.
N Reactor Updated Safety Analysis Report, NUSAR.
28 Feb 78, 427p
Contract EY-76-C-06-1857

An update of the N Reactor safety analysis is presented to reconfirm that the continued operation does not pose undue risk to DOE personnel and property, the public, or the environment. A reanalysis of LOCA and reactivity transients utilizing current codes and methods is made. The principal aspects of the overall submission, a general description, and site characteristics including geography and demography, nearby industrial, transportation and military facilities, meteorology, hydraulic engineering, and geology and seismology are described. (ERA citation 04:023173)

UNI-M-90(V.2) PC **A19**/MF **A01**
United Nuclear Industries, Inc., Richland, WA.
N Reactor Updated Safety Analysis Report, NUSAR.
28 Feb 78, 430p
Contract EY-76-C-06-1857

The safety of the design of structures, components, equipment, and systems of the N Reactor is presented. Data is presented concerning conformance with NRC design criteria; classification of structures, systems, and components; wind and tornado loadings; water level (flood) design; missile protection; protection against dynamic effects associated with postulated break of pipes; seismic design; Category I structure design; mechanical systems and components; seismic qualification of Category I instrumentation and electrical equipment; and environmental design of mechanical and electrical equipment. (ERA citation 04:023174)

UNI-667 PC **A03**/MF **A01**
United Nuclear Industries, Inc., Richland, WA.
Accident Confinement Response and Dose Calculations of Single Pressure Tube Events for NUSAR.
S. P. Roblyer. 31 Aug 78, 46p
Contract EY-76-C-06-1857

The assumptions, methods of analysis and results of the analysis of single tube accidents which have significant offsite radiological consequences are described. Those accidents described include: pressure tube flow blockage; fuel ejection; and pressure tube break. (ERA citation 04:023103)

UTNL-R-0046 PC **A04**/MF **A01**
Tokyo Univ. (Japan). Nuclear Engineering Research Lab.
Fiscal 1976 Report of Meeting on Heat and Structures in Nuclear Engineering, and Symposium on Numerical Analysis of Transport and Diffusion Phenomena in Nuclear Engineering.
Jun 77, 55p CONF-7703116-
In Japanese.Meeting on heat and structures in nuclear engineering, and symposium on numerical analysis of transport and diffusion phenomena in nuclear engineering, Tokai, Ibaraki, Japan, 16 Mar 1977.

Papers from this meeting were processed individually for inclusion in the data base. (ERA citation 04:026288)

VTT-LVI-40 MF **A01**
Valtion Teknillinen Tutkimuskeskus, Espoo (Finland). LVI-Tekniikan Lab.
Controlling Flow Conditions of Test Filters in Iodine Filters.
R. Holmberg, and J. Laine. Mar 79, 54p
U.S. Sales Only. Microfiche copies only.

Several different iodine filter and test filter designs and experience gained from their operation are presented. For the flow experiments, an iodine

filter system equipped with flow regulating and measuring devices was built. In the experiments the influence of the packing method of the iodine sorption material and the influence of the flow regulating and measuring divices upon the flow conditions in the test filters was studied. On the basis of the experiments it has been shown that the flows through the test filters always can be adjusted to a correct value if there only is a high enough pressure difference available across the test filter ducting. As a result of the research, several different methods are presented with which the flows through the test filters in both operating and future iodine sorption system can easily be measured and adjusted to their correct values. (Atomindex citation 11:497058)

WAPD-TM-1164 PC **A07**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Fuel-Rod/Support-Grid Scratching and Friction (LWBR Development Program).
J. W. Stout. Oct 79, 147p
Contract EY-76-C-11-0014

Equations have been developed from test measurements for use in defining the anticipated range of potential fuel-rod scratch depths resulting from rod-grid interaction during LWBR module assembly. Correlations estimating the friction coefficients expected between the AM-350 support grids and the Zircaloy-clad fuel rods have also been derived. Experience with the use of a colloidal graphite suspension as a clad lubricant to facilitate fuel-rod installation and minimize clad assembly damage is described. Inspection results concerning clad scratches which occurred during the actual rod-installation phase of LWBR assembly appear consistent with the subject test findings. (ERA citation 05:000818)

WAPD-TM-1324 PC **A03**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Effect of Fuel Chips on Cladding Stress in Zircaloy Clad Oxide Fuel Rods (LWBR Development Program).
J. F. Yerman. Nov 78, 28p
Contract EY-76-C-11-0014

Zircaloy clad oxide fuel rods are subjected to a variety of core power transients. One of these, an uppower transient, can place a severe burden on the fuel rod cladding that would potentially lead to rupture if not properly allowed for during the fuel rod design and plant operation. The cladding stress during such a transient can be increased by the presence of fuel chips between the oxide fuel pellet and the cladding. An analysis procedure based on mechanical tests of fuel and cladding was developed that permits calculation of the stress increase due to chips, so that the stress penalty can be accommodated without unnecessary penalties to fuel rod performance. The method of evaluating the maximum cladding bending tensile stress near the chip is described and test data are presented to support the analysis method. (ERA citation 04:033598)

WAPD-TM-1326 PC **A08**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Summary of the Nuclear Design and Performance of the Light Water Breeder Reactor (LWBR) (LWBR Development Program).
H. C. Hecker. Jun 79, 168p
Contract EY-76-C-11-0014

This report presents a summary of the nuclear design and expected nuclear performance of the Light Water Breeder Reactor during operation at the Shippingport Atomic Power Station. Performance predictions are presented for core lifetime, breeding margin, power distributions and performance, kinetic and stability parameters, and for core shutdown and reactivity control capability. Also included is a summary of as-built dimensions of core components and of development of breeding parameter equations and sensitivities. (ERA citation 04:053193)

WAPD-TM-1438 PC **A03**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Application and Experimental Qualification of the Equivalent Solid Plate Method to the Analysis of Perforated Plates with Square Penetration Patterns.
D. P. Jones, and G. M. Henry. Oct 79, 39p
Contract EY-76-C-11-0014

The analysis of perforated plates containing circular penetrations arranged in a square pattern is greatly complicated by the orthotropy and circumferential variation of the equivalent solid plate material properties. These complications make the application of the equivalent solid plate concept for this type of penetration pattern to problems involving axisymmetric geometries and loadings very difficult. Unfortunately, the alternatives to the equivalent solid plate concept in a large number of practical situations require explicit three-dimensional modeling of each penetration and therefore is both costly and time consuming if not impossible due to problem size. Approximate techniques are developed in this paper which facilitate the application of the equivalent solid plate properties for the square penetration pattern perforated plate geometry to axisymmetric analysis. The problem is discussed within the context of the finite element method and appropriate material property relationships are derived which facilitate axisymmetric analysis. These techniques and relationships are also used in the formulation of a thin plate analysis. Finally, after a summary of the experimental methods, comparisons with experimental results are given which substantiate the assumptions made permitting the axisymmetric analysis. (ERA citation 05:007022)

WAPD-TM-1450 PC **A04**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
FLASH6 Simulation of Semiscale Blowdown Data, NRC Standard Problems 2 and 3: (LWBR Development Program).
B. D. Harris, D. A. Prelewicz, and S. G. Beus.
Sep 79, 70p
Contract EY-76-C-11-0014

FLASH6 computer program calculations are compared with experimental data from two simulated loss-of-coolant accident blowdown tests which are designated as numbers 2 and 3 in the Standard problem Series sponsored by the Nuclear Regulatory Commission for reactor safety assessment. Both tests are isothermal blowdowns smulating a double-ended, cold-leg break and were conducted in the electrically-heated, 1-1/2 Loop Semiscale System at Idaho National Engineering Laboratory. The blowdown tests were initiated at nominal conditions of 575 exp 0 F, 2250 psia and 17.3 lbm/sec loop flow rate. (ERA citation 05:003081)

WAPD-TM-1451 PC **A03**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Critical Heat Flux Tests with High Pressure Water in an Internally Heated Annulus with Alternating Axial Heat Flux Distribution.
S. G. Beus, and D. A. Humphreys. Sep 79, 30p
Contract EY-76-C-11-0014

Critical heat flux experiments were performed with an alternating heat flux profile in an internally heated annulus. The heated length was 84 inches with a square wave alternating heat flux profile over the last 12 inches having a maximum-to-average heat flux ratio of 1.76. Test data were obtained at pressures from 800 to 2000 psia, mass velocities from 0.25 x 10 exp 6 to 2.8 x 10 exp 6 lb/hr-ft exp 2 and inlet temperatures ranging from 400 to 600 exp 0 F. Two different electrically heated test sections were employed both with 72 inch uniform and 12 inch alternating heat flux sections. The second test section had a 0.44 inch hot patch with a peak-to-average heat flux ratio of 2.7 superimposed on the alternating flux profile at the exit end. Critical heat flux results with the alternating heat flux profile and with the superimposed hot patch were shown to be equivalent to those obtained in previous tests with a uniform heat flux profile except for several data points at low mass velocity and high enthalpy for which there is an apparent experimental bias in the uniform heat flux results. (ERA citation 05:004510)

ZfK-371 PC **A03**/MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German D.R.).
SALLY - A Computer Programme for the Calculation of the Dynamical Behaviour of a Cooling Channel.
C. Reiche, and D. Ziegenbein. Dec 78, 32p
U.S. Sales Only.

This report describes the mathematical-physical fundamentals and provides a user's manual as well as some test examples for the programme SALLY. SALLY is suitable for the calcuiation of the dynamical behaviour of a cooling channel under following conditions: point-kinetics, heat transfer in the fuel in radial direction only, reactivity feedback, simple model of the first cooling cycle. Reactivity, coolant inlet temperature or coolant velocity can be disturbed. (Atomindex citation 10:466593)

ZJE-213 PC **A02**/MF **A01**
Skoda, Plzen (Czechoslovakia). Zavod Vystavbe Jadernych Elektraren.
Surveillance Specimens - Part of the Reactor Pressure Vessel Reliability and Safety Program.
M. Brumovsky. 1977, 23p
U.S. Sales Only.

Pressure vessel safety is assessed in the project design stage on the basis of calculations. Owing to the fact that materials differ and operation regimes are not constant, in-service inspections during pressure vessel lifetime must be carried out. The inspections are non-destructive, and destructive, i.e., the so called surveillance specimens programs. Comparisons made of the calculated values for separate areas of the pressure vessel show the importance of both types of in-service inspections. (Atomindex citation 09:418508)

ZJE-214 PC **A02**/MF **A01**
Skoda, Plzen (Czechoslovakia). Zavod Vystavbe Jadernych Elektraren.
Two-Criteria Approach to Reactor Pressure Vessel Safety and Reliability Evaluation.
M. Brumovsky. 1977, 22p
U.S. Sales Only.

The crack-initiation approach and the crack-arrest approach are the two techniques most often used nowadays for evaluating the safety of pressure vessels. The former is based on the methods of Linear Elastic Fracture Mechanics and Fracture Toughness, while the Fracture Analysis Diagram and the Crack Arrest Temperature underlie the latter. By introducing some formalism and the unified temperature (Tsub(R)), a formal unification of both approaches mentioned above is sought for. Experimental data suggest using the Nil Ductility Temperature as a reference temperature for both approaches. Using the theoretical background of linear elastic fracture mechanics it is possible to construct the Defect Analysis Diagram which summarizes the dependencies of critical sizes of flaws. The dependence on the crack arrest temperature is also included, which seems to be highly advantageous. In this way it is possible with the use of only one diagram to determine all necessary parameters either for critical or allowable state of the pressure vessel (or of other type of equipment) in the stage of design, manufacture and exploitation. This process is easy as the inlet of the changes in mechanical properties or flaw size induced in material by exploitation means only some shift of scales. This diagram is applicable also for the evaluation of results received from the in-service inspections of pressure vessels. (Atomindex citation 09:418509)

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AED-Conf-77-498-032 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Cladding Tubes of Zircaloy and Steel.
H. Kessel. 1977, 9p CONF-7709147-68
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

Zircaloy 2 and 4 are the most important zirconium alloys for use as fuel cladding material in light and heavy water reactors. In fast breeder reactors the cladding tubes are of a modified 16/16- Cr-Ni-type with improved mechanical, long-term creep rate and rupture - life versus temperature properties. Starting with hot-extruded tube shells the fabrication of Zircaloy cladding tubes is done by 3 - 4 cold reduction steps in tube reducers or rolling machines followed by heat treatments in vacuum. To

obtain the specified properties a precise combination of final area reduction and final annealing is absolutely necessary. The fabrication route of stainless steel claddings and guide tubes is similar to the Zircaloy production, exceptionally the last cold-forming steps are made on cold-drawing benches, because of economic reasons. After each cold reduction the material is annealed at recrystalisation temperatures under protective atmospheres. As example, some of the important properties of fuel cladding tubes, i.e. mechanical and technological data, microstructure, corrosion resistance and hydrid orientation, are reported. A brief survey is given about the quality assurance and inspection system which is necessary for obtaining the same final tube properties for a longer production period. (Atomindex citation 09:385899)

AREAEE-213 PC **A02**/MF **A01**
Atomic Energy Establishment, Inshas (Egypt).
Some Characterisation Profiles of Uranium Oxides Pertaining to Ceramic Fuel Preparation.
S. A. El-Fekey, A. F. Bishay, M. Y. Farah, and F. H. Hammad. 1978, 20p
U.S. Sales Only.

The effect of several variables during various stages of preparation of UO sub 2 powder such as precipitation, calcination and reduction on some physico-chemical properties of intermediate oxides and UO sub 2 powders were investigated. The methods used for characterisation were powder density, specific surface area by permeability, X-ray analysis and O/U ratio by T.G.A. The powder density of uranates was found to increase with the decrease of uranium content in uranyl nitrate solution, the increase of pH and duration of precipitation. The surface area of uranates was found to increase with the increase of pH, temperature of precipitation and the decrease of duration of precipitation. The effect of calcination for 18 hours showed that as the calcination temperature was increased for 100-800 exp 0 C, the powder density increses and the surface area decreases. The variaton in powder density of uranates were eliminated when calcination was carried out at 700 exp 0 C for 18 hours. The progress of the formation of intermediate oxide was followed by X-rays analysis. Two steps reduction methods, two hours at 400 exp 0 C followed by two hours at 700 exp 0 C, eliminated the effect of preparatory history on the O/U ratio and produced powders having more or less the same O/U ratio. (Atomindex citation 10:454825)

BARC-944 PC **A06**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Annual Report of the Metallurgy Division (For the) Period Ending December 1976.
K. Elayaperumal, C. K. Gupta, P. Mukhopadhyay, and S. V. K. Rao. 1977, 104p
U.S. Sales Only.

An account of the work done in the Metallurgy Division of the Bhabha Atomic Research Centre, Bombay, during the calendar year 1976 is given. Some of the major achievements are: (1) production of boron carbide and boral sheet for the Trombay R-5 reactor under construction, (2) production of niobium metal for the manufacture of Zr-Nb-Cu alloy garter springs, (3) development of a process for graphite coating on zircaloy, (4) studies on structural and metal physics aspects of zirconium alloys and steels, (5) studies on the corrosion behaviour of zircaloy-2 as affected by the replacement of helium and stress corrosion cracking of zircaloy fuel tubes in iodine atmosphere and (6) production of high density UO sub 2 pellets with stable microstructures and sinterable magnesium oxide for MHD application. (Atomindex citation 10:493873)

DOE/ET/47906-4 PC **A03**/MF **A01**
Nuclear Services Corp., Campbell, CA.
Reactivity Monitoring. Final Report, Task 2.
M. Reier, and J. Ching. 5 May 80, 26p
Contract AC09-79ET47906

A study has been made of a pulsed neutron technique which can be used to estimate the reactivity worth of spent fuel assemblies prior to storage. Nuclear design has been performed of a subcritical facility which can accommodate a test assembly of fresh fuel as well as one with a high degree of burnup. Calculations include the k/sub eff/ of the system and the gamma shielding required to protect personnel and instrumentation from fission product radiation. In addition, the technique and relevant equations to analyze the data are discussed. The calculations indicate that the technique can provide a rough differentiation between assemblies based on reactivity. However, practical problems involving the shield and neutron source impose severe limitations on the use of this method. (ERA citation 05:023706)

DP-R-242(Pt.1) PC **A07**/MF **A01**
Organization for Economic Co-Operation and Development, Winfrith (England). High Temperature Reactor Project.
Safety Assessment for Dragon Fuel Element Production. Pt. 1 - Description.
M. S. T. Price. Nov 63, 143p
U.S. Sales Only.

This report shall be the Safety Assessment covering the manufacture of the First Charge of Fuel and Fuel Elements for the Dragon Reactor Experiment. It is issued in two parts, of which Part I is descriptive and Part II gives the Hazards Analysis, the Operating Limitations, the Standing Orders and the Emergency Drill. (Atomindex citation 10:491935)

ECN-46 PC **A03**/MF **A01**
Stichting Energieonderzoek Centrum Nederland, Petten.
Inelastic Finite Element Analysis of a Pipe-Elbow Assembly (Benchmark Problem 2).
H. P. Knapp, and J. Prij. Sep 78, 45p
U.S. Sales Only.

In the scope of the international benchmark problem effort on piping systems, benchmark problem 2 consisting of a pipe elbow assembly, subjected to a time dependent in-plane bending moment, was analysed using the finite element program MARC. Numerical results are presented and a comparison with experimental results is made. It is concluded that the main reason for the deviation between the calculated and measured values is due to the fact that creep-plasticity interaction is not taken into account in the analysis. (Atomindex citation 10:429747)

GKSS-79/E/14 MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Werkstofftechnologie und Chemie.
Uranium Extraction from the Sea. Considerations on the Layout of a Technical Plant after the Fluidized Adsorbation Bed Concept.
P. H. Koske. 1979, 33p
In German.
U.S. Sales Only. Microfiche copies only.

The present report contains considerations on the layout of a technical plant for uranium extraction out of sea water after the fluidized adsorbate bed concept and by means of natural ocean currents for the water transportation through the adsorption plant. Simple relations are given that allow layout calculations for larger production plants by using some adsorbate dependent process technological parameters as well as natural boundary conditions. (Atomindex citation 11:496639)

INIS-mf-4110 PC **A04**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Div. de Engenharia Quimica.
Study of the Formation of Complexes of Nitrosyl-Rhutenium Nitrates with Thiourea. Application to Rhutenium Decontamination in the Extraction with TBP-Varsol in the Chemical Treatment of Spent Fuel.
B. Floh. 1977, 71p
In Portuguese.Thesis.
U.S. Sales Only.

A method for the treatment of spent uranium fuel is presented, based on the Purex process using thiourea to increase the ruthenium decontamination factor. Thiourea exhibits a strong tendency for the formation of coordination compounds in acidic media. This tendency serves as a basis to transform nitrosyl-ruthenium species into Ru(SC(NH)(NH sub 2)) exp 2+ and Ru(SC(NH)(NH sub 2)) sub 3 complexes which are unextractable by TBP-varsol. The best conditions for the ruthenium-thiourea complex formation were found to be: thiourea-ruthenium ratio (mass/mass) close to 42, at 75 exp 0 C, 30 minutes reaction time and aging period of 60 minutes. The ruthenium decontamination factor for a single uranium extraction are ca. 80-100, not interfering with extraction of actinides. These values are rather high in comparison to those obtained using the conventional Purex process (e.g. F.D. sub(Ru)=10). For this reason, the method developed here is suitable for the treatment of spent uranium fuels. Thiourea (100 g/l) scrubbing experiments of ruthenium, partially co-extracted with actinides, confirmed the possibility of its removal from the extract. With this procedure a decontamination greater than 83.5% for ruthenium as fission product is obtained in two stages. (Atomindex citation 09:365100)

INIS-mf-4877 PC **A10**/MF **A01**
Welding of Austenitic Stainless Steel Internals for Nuclear Reactors.
G. P. Pelceo. Sep 75, 201p CONF-7509213-P2
International school of welding, Tatranska Lomnica, Czechoslovakia, 29 Sep 1975.
U.S. Sales Only.

Chromium-nickel austenitic stainless steel containing 18 to 20% chromium, 8 to 12% nickel and a maximum of 0.08% carbon (type AISI 304) was used for the manufacture of pressure vessel internals. Welding electrodes were made of low-carbon austenitic stainless steel containing 18% Cr and 8% Ni. The pressure vessel internals were welded and cut using the techniques of manual shielded metal-arc welding, automatic submerged arc welding, manual tungsten-argon welding, and plasma thermal cutting. A list is shown of internal components containing the description of the welding and cutting procedures for a core shroud, a lower core support plate, an upper guide grid, a shroud head, and several water separators. Typical problems are described involved in the welding, cutting and general machining of internals, such as hot crack formation and intergranular corrosion. Technological processes and conditions are discussed including stress relief treatment, welding cycle, welding heat input limitation, dimensional checking, design machining allowances, mechanical machining, cleanliness conditions, foreign particle removal, and cobalt content limitation. (Atomindex citation 10:451657)

INIS-mf-5404 PC **A04**/MF **A01**
Nuclear Energy Agency, Paris (France).
OECD: Halden Reactor Project. 18. Annual Report 1977.
1979, 74p
U.S. Sales Only.

The work at the Project has continued in the two main fields: test fuel irradiation and fuel research, and computer based process supervision and control. Organizations participating in the Project continue to have their fuel irradiated in the Halden Reactor in instrumented test assemblies designed and manufactured by the Project. The Project's fuel studies continue to focus on specific subjects such as fuel pellet/cladding interaction and heat transfer, fission product release and fuel behavior under loss of coolant conditions. The work on process control and supervision continues in the highly relevant fields of core control and operator-process communication. A system for predictive core control is being developed while special mathematical methods for core power distribution control are being studied. Operator-process communication studies comprise use of computer simulation on colour display as important ingredients, while the work on developing a system for interactive plant disturbance analysis continues. (Atomindex citation 11:503209)

Juel-1555 PC **A06**/MF **A01**
Kernforschungsaniage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen.
Pyrolisis and Mass Transfer of Hydrocarbon During Coating-Process of Fuel Particles in a Conical Fluidized Bed.
H. J. Penkalla, E. Gyarmati, and H. Nickel. Nov 78, 112p
In German.Diss.
U.S. Sales Only.

The coating of the fuel particles for the High Temperature Reactor with pyrocarbon takes place in

fluidized beds by the pyrolysis of hydrocarbons at high temperatures. The texture of the pyrocarbon layers is composed of several components which originate from different stadiums of the pyrolysis. The deposition of the different components of structure takes place in different regions of fluidized bed. In this report the various zones of deposition are determined by experiment. In addition to that, it is shown which facts of the pyrolysis process influence the proportions of the certain components of structure in the layer. The results are summarized to a 'coating-equation' which correlates the parameters of the coating process with the layer data. (Atomindex citation 10:469402)

NIIAR-5(364) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Corrosion and Activation of Circuit NPP Boiling Reactor under Neutral Correction-Free Water-Chemical Conditions (Experience of the VK-50 NPP Operation).
A. I. Zabelin, A. B. Andreeva, Yu. V. Chechetkin, V. E. Shmelev, and L. N. Stupina. 1979, 14p
In Russian.
U.S. Sales Only.

Experience of the VK-50 NPP operation is given from the viewpoint of the chosen water-chemical regime on the state of equipnment and pipelines. The 12-year experience of the NPP operation in the correctionless neutral water-chemical regime using various construction materials has permitted to make a conclusion about sufficient reliability and corrosion resistance of carbon steels as the main construction material. To prevent dangerous corrosion on the phase interface in vapour separators made of carbon steels it is necessary to construct a so-called varying level. Utilization of carbon steels excludes carrying-out of elements into the coolant, activation of which leads to production of long-lived radionuclides of deposits accumulating in due course on inner surfaces of reactor the washing-out of the reactor under breakdown should be performed by boron citrate and ammonium citrate solutions inhibited by thiourea before planned maintenance. (Atomindex citation 11:496386)

NUREG/CR-1119 PC **A05**/MF **A01**
Naval Research Lab., Washington, DC.
Piping Inelastic Fracture Mechanics Analysis.
Memorandum rept.,
C. I. Chang, M. Nakagaki, C. A. Griffis, and R. A. Masumura. 30 Jun 80, 93p NRL-MR-4259
Contract NRC-03-79-116

Available experimental data and the analytical methods for predicting rupture of LWR piping are assembled and assessed. The analytical techniques investigated can be catologued into three major groups: structural response, semiempirical methods, and the J-controlled growth approach. A leak-before-break condition is also investigated.

NUREG/CR-1198-V-1 PC **A08**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Design Guidance and Evaluation Methodology for Fixed-Site Physical Protection Systems. Volume I: Description, Implementation, and Testing of Design Guidance and Evaluation Methodology,
H. A. Bennett, and M. T. Olascoaga. Jul 80, 175p SAND-79-2378/1

Design guidance products and a system performance evaluation methodology have been developed to aid the Nuclear Regulatory Commission in the implementation of new regulations designed to upgrade the physical protection of nuclear fuel cycle facilities. The evaluation methodology which incorporates the design guidance products, provides a means of arriving at an overall measure of performance for each capability required in the regulations. To arrive at this measure of performance, first the scores associated with responses to a series of equipment and procedure questionnaires are aggregated. The aggregation of scores then proceeds through successive levels of a hierarchical structure developed for each capability.

NUREG/CR-1234 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
The Insider Threat to Secure Facilities: Data Analysis.
Jun 80, 75p UCRL-52744
Prepared in cooperation with Heineke (J. M.) and Associates, Los Gatos, CA.

Three data sets drawn from industries that have experienced internal security breaches are analyzed. The industries and the insider security breaches are considered analogous in one or more respects to insider threats potentially confronting managers in the nuclear industry. The three data sets are: bank fraud and embezzlement (BF&E), computer-related crime, and drug theft from drug manufacturers and distributors. A careful analysis by both descriptive and formal statistical techniques permits certain general conclusions on the internal threat to secure industries to be drawn. These conclusions are discussed and related to the potential insider threat in the nuclear industry.

NUREG/CR-1425 PC **E02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Cracking and Relocation of UO2 Fuel during Initial Nuclear Operation,
Anthony D. Appelhans, Sig J. Dagbjartsson, and Richard W. Miller. May 80, 38p EGG-2032
Contract DE-AC07-76IDO1570
Includes 3 sheets of 48X reduction microfiche.

Long-term irradiations of instrumented fuel assemblies at the Heavy Boiling Water Reactor in Halden, Norway are being managed by EG&G Idaho, Inc., for the Nuclear Regulatory Commission. One of these instrumented fuel assemblies, IFA-430, was used to study fuel cracking and relocation during initial nuclear operation. The threshold power at which pellet cracking and relocation is complete during the first power ramp and the effects of fabricated fuel-cladding gap size and power ramp rate on the threshold power value were determined from fuel rod axial gas flow data. No significant cracking or relocation was found to occur during the second, third, or fourth power ramps.

NUREG/CR-1477 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Heavy-Section Steel Technology Program Quarterly Progress Report for January-March 1980,
G. D. Whitman, and R. H. Bryan. Jul 80, 49p
ORNL/NUREG/TM-393
Contract W-7405-eng-26
See also report for Oct-Dec 79, NUREG/CR-1305.

The studies are related to all areas of the technology of materials fabricated into thick-section primary-coolant containment systems of light-water-cooled nuclear power reactors. The investigation focuses on the behavior and structural integrity of steel pressure vessels containing cracklike flaws. Current work is organized into five tasks: (1) program administration and procurement, (2) fracture mechanics analyses and investigations, (3) investigations of irradiated materials, (4) thermal shock investigations, and (5) pressure vessel investigations.

NUREG-0559 PC **A09**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
A Comparative Analysis of LWR (Light Water Reactor) Fuel Designs.
Technical rept.,
D. L. Acey, and J. C. Voglewede. Jul 80, 187p

The computer code CAPCON-THERMAL-2 was used to generate thermal performance predictions for the spectrum of commercial light water reactor fuel designs at four different steady-state power levels. The input parameters for the code were obtained from design data that are non-proprietary and are tabulated in this report. Calculated values of maximum fuel temperature, average fuel temperature, stored energy, gap conductance, fission gas release and rod internal pressure are plotted as a function of burnup. Radial fuel pellet temperatures are also plotted at one burnup level.

PB80-203417 PC **A99**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Measurement Technology for Safeguards and Materials Control,
Thomas R. Canada, and B. Stephen Carpenter. Jun 80, 772p NBS-SP-582
Sponsored in part by American Nuclear Society, Washington, DC., and Institute of Nuclear Materials Management, Columbus, OH. Prepared in cooperation with Los Alamos Scientific Lab., NM. Library of Congress catalog card no. 80-600072. Proceedings from American Nuclear Society Topical Meeting held November 26-30, 1979, Kiawah Island, South Carolina.

This publication contains the proceedings of the American Nuclear Society's Topical Conference entitled, Measurement Technology for Safeguards and Materials Control. The presentations were applications oriented and offered a good balance between chemical analysis, nondestructive assay techniques, bulk measurement techniques, inspection techniques, and integrated systems for material measurements and control. Reports discussing preparation and use of reference materials and measurement traceability were included. Examples of measurement requirements and techniques used for both national and international safeguards are given. Approaches to various analysis of materials throughout the fuel cycle from enrichment and fuel fabrication to spent fuel and reprocessing are considered.

PNC-J-272-77-04 MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Survey of Creep Data on Structural Materials of Fast Breeder Reactor.
S. Yoshida. Nov 77, 207p
In Japanese.
U.S. Sales Only. Microfiche copies only.

The reactor vessels and other components of fast breeder reactor is affected by high neutron irradiation at elevated temperatures. However, in this regard, related test data on creep property of component materials and welds at elevated temperatures are a few in Japan, and especially, there are no data available on the irradiation effect. It will take 3 to 7 years before the results of currently planned research and development on prototype fast breeder become available. On the other hand, establishment of design base for prototype fast breeder and other needs call for early solution to such problems. The Committee should, therefore, collect from documents the latest data on experiments on structural materials overseas and in our country, and survey and analyze the problems in order to proceed with the future research and development in the most effective way. It was for this purpose that the Fourth Subcommittee at Technical Research Association for Integrity of Structures at Elevated Service Temperatures was commissioned by Power Reactor and Nuclear Fuel Development Corporation to conduct the examination and study of related data by establishing Group 41G. This collection of data is the compilation of the above results. (Atomindex citation 10:469343)

PNL-3064 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
ThO sub 2 -Based Pellet Fuels - Their Properties, Methods of Fabrication, and Irradiation Performance: A Critical Assessment of the State of the Technology and Recommendations for Further Work.
P. E. Hart, C. W. Griffin, K. A. Hsieh, R. B. Matthews, and G. D. White. Sep 79, 167p
Contract EY-76-C-06-1830

This critical assessment of the ThO sub 2 -UO sub 2 pellet fuel technology was conducted in support of the Fuels Refabrication and Development Program (FRAD). Included in this critical review are the following areas: powder preparation; pellet fabrication; fuel chemical, physical, and mechanical properties; and fuel irradiation performance. The authors identify (1) areas where data are either deficient or lacking and (2) requirements for additional development and experimental work. (ERA citation 05:008885)

STUDSVIK-BL-78-4 PC **A03**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Fission Product Migration in Intact Fuel Rods. S176 Experiments 1-5: Axial gamma Scanning Results.
W. Blackadder, R. Forsyth, K. Malen, and Bengt-Aake Nilsson. Mar 78, 34p
U.S. Sales Only.

This report is the fifth of a group which present the results obtained during the first 5 experiments in

the S176 series of irradiation experiments. The aim of this series is to provide information on the distribution of fission products in intact irradiated fuel rods, both within the UO sub 2 fuel and on the inside of the Zircaloy clad. Fuel rods, previously irradiated to appreciable burnups in the Aagesta R3 reactor, after cooling, are re-irradiated in the Studsvik R2 test reactor for short periods to build up significant inventories of short-lived fission products of interest. Examination of sections of fuel and clad is performed within a short time after removal from the reactor. (Atomindex citation 10:430671)

UCID-18660 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Advanced Three-Dimensional Thermal Modeling of a Baseline Spent Fuel Repository.
T. J. Altenbach, and W. E. Lowry. 29 Apr 80, 55p
Contract W-7405-ENG-48

A three-dimensional thermal analysis using finite difference techniques was performed to determine the near-field response of a baseline spent fuel repository in a deep geologic salt medium. A baseline design incorporates previous thermal modeling experience and OWI recommendations for areal thermal loading in specifying the waste form properties, package details, and emplacement configuration. The base case in this thermal analysis considers one 10-year old PWR spent fuel assembly emplaced to yield a 36 kW/acre (8.9 W/m exp 2) loading. A unit cell model in an infinite array is used to simplify the problem and provide upper-bound temperatures. Boundary conditions are imposed which allow simulations to 1000 years. Variations studied include a comparison of ventilated and unventilated storage room conditions, emplacement packages with and without air gaps surrounding the canister, and room cool-down scenarios with ventilation following an unventilated state for retrieval purposes. It was found that at this low-power level, ventilating the emplacement room has an immediate cooling influence on the canister and effectively maintains the emplacement room floor near the temperature of the ventilating air. (ERA citation 05:023710)

UCRL-15101 PC **A05**/MF **A01**
Ames Lab., IA.
Survey of Simulation Methods for Modeling Pulsed Sieve-Plate Exiraction Columns.
L. Burkhart. Mar 79, 96p
Contract W-7405-ENG-48

The report first considers briefly the use of liquid-liquid extraction in nuclear fuel reprocessing and then describes the operation of the pulse column. Currently available simulation models of the column are reviewed, and followed by an analysis of the information presently available from which the necessary parameters can be obtained for use in a model of the column. Finally, overall conclusions are given regarding the information needed to develop an accurate model of the column for materials accountability in fuel reprocessing plants. 156 references. (ERA citation 04:052645)

WAPD-TM-1235 PC **A04**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Fuel Rod Welding (LWBR Development Program).
W. L. Bickel. Feb 79, 54p
Contract EY-76-C-11-0014

Procedures were developed to weld both ends of approximately 25,000 fuel rods for the Light Water Breeder Reactor (LWBR) core. The rods were welded using the gas tungsten arc (GTA) method in high-purity helium at 1 atmosphere. Welding parameters, including weld current, arc gap, and speed of rotation, were established to control the size of the weld. Electrode and chill positioning with respect to the endclosure/tube joint controlled the location of the weld. Weld quality of the fuel rods was ensured by 100-percent nondestructive testing by ultrasonic and radiographic inspection and the destructive evaluation of process control samples in each weld lot. (ERA citation 04:036417)

WCAP-9474 PC **A06**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Nuclear Fuel Div.
Fuel Pellet Encapsulation System Barrier Seal Development Program.
W. L. Johnson. Apr 79, 112p
Contract EN-77-C-06-1058-006

An evaluation of barrier seal concepts applicable to mechanized mixed oxide fuel pellet encapsulation was conducted. The selected concept, a two-dimensional venturi with sphincteral valve, was shown to provide effective containment of both gaseous and airborne particulate by a series of normal and abnormal condition tests. Recommendations for a program to demonstrate performance of a prototype seal under simulated production conditions have been made and are included. (ERA citation 05:000219)

18K. Reactor Physics

AED-Conf-78-023-002 PC **A03**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Physical Fundamentals of Reactor Engineering.
P. Zoller. 1978, 40p CONF-780272-1
In German.Meeting on reactor engineering and nuclear power supply, Essen, F.R. Germany, 27 Feb 1978.
U.S. Sales Only.

The paper is meant to be an introduction into reactor physics for educated laymen. Focal points are nuclear fission and subsequent energy release, controlled chain reaction as a precondition for the construction and operation of nuclear power plants, determination of critical reactor size and possibilities of reactor control. (Atomindex citation 09:405081)

CEA-N-2002 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Rayonnements Ionisants.
Determination of the Neutron Spectrum in the Well Naiade Attached to the Reactor Nereide.
A. Capgras, C. Clement, and M. Sueur. Nov 77, 29p
In French.
U.S. Sales Only.

The spectral distribution of neutrons in the centre of the Naiade well attached to the Fontenay-aux-Roses Nereide reactor is studied. In the thermal, epithermal and over 2.2 MeV regions, activation detectors are used: exp 197 Au and exp 55 Mn (bare and under cadmium), and exp 58 Ni. In the energy band from a few keV to 2.2 MeV two recoil proton proportional counters are employed. Under these conditions the whole spectrum is studied, but some comments are made on the difficulties of interpreting the results obtained by either of these methods. (Atomindex citation 09:410349)

CEA-N-2034 MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau.
Contribution to the Elaboration of the Neutronic Calculation Scheme for the Light Water Reactors with Slab Fuel Elements.
These (3e Cycle),
B. Noel. May 78, 133p
In French.
U.S. Sales Only. Microfiche copies only.

The use of slab fuel elements in the light water reactors is interesting for the thermohydraulic aspects, but it induces some difficulties for the neutronic calculations. This thesis is devoted to the discussion of some of them: comparison with the pin lattices, resonance capture by exp 238 U, effective temperature for the Doppler effect, reduction of the number of energy groups, adjustment of the fission cross section of exp 235 U in order to improve the temperature coefficient calculation. A complete calculation scheme is proposed and checked against experiment. (Atomindex citation 11:501425)

CONF-791051-23 MF **A01**
Oak Ridge National Lab., TN.
Covariances of Fission-Integral Measurements at the NBS exp 252 Cf and ISNF Facilities and at the ORNL-PCA Facility.
J. J. Wagschal, R. E. Maerker, and D. M. Gilliam. 1979, 11p
Contract W-7405-ENG-26
ASTM-EURATOM symposium on reactor dosimetry, Ispra, Italy, 1 Oct 1979.
Microfiche copies only.

Integral measurements together with accompanying uncertainty estimates have been used for the past fifteen years in cross section adjustments. As the field of cross section adjustment came of age, the crude uncertainty estimates were replaced - only in principle, initially - by a quantitative cross section uncertainty covariance description and by uncertainty correlations of integral experiments. There is current interest in the fission reaction rate ratio measurements in the NBS standard neutron fields by people involved in fast reactor cross sections. Also those in the LWR pressure vessel surveillance dosimetry program are interested in these measurements and in similar measurements performed in the Oak Ridge Pool Critical Assembly (PCA). A careful re-examination of uncertainty analysis is presented. (ERA citation 05:024070)

FEI-827 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Transformation of the P1-Approximation Set of Equations into a Diffusion Equation Retaining Linearity of Boundary Conditions.
I. R. Susiov. 1978, 6p
In Russian.
U.S. Sales Only.

The finite element method was applied to the calculation of two-dimensional reactor models in many-group P1 approximation of the spherical harmonics method. So the way to reduce the problem to a diffusional one with retaining linearity of conditions on boundaries spreads to the many-dimensional case. (Atomindex citation 10:430571)

IAE-3048 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Elementary Solutions of the Group Equation of Neutron Transport.
V. F. Boyarinov. 1978, 23p
In Russian.
U.S. Sales Only.

For the solution of the neutron transport equation in reactors developed is the extended system of plane elementary solutions in the group approximation and the completeness of the system is proved. On the basis of this system constructed are group regular and singular elementary solutions, posessing a cylindrical symmetry; for these solutions biorthogonal relations have been obtained. Besides the Green group function for a cylindrical source is constructed. (Atomindex citation 11:501428)

IEA-493 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Div. de Engenharia Nuclear.
Analysis of Neutron Parametors in Light Water Moderated Lattices of ThO sub 2 and UO sub 2 Fuel Rods.
J. Onusic Junior, and W. J. Oosterkamp. Dec 77, 21p
In Portuguese.
U.S. Sales Only.

A large number of light water moderated lattices of UO sub 2 and ThO sub 2 fuel rods were analyzed with the code HAMMER. The purpose of the study was to compare experimental results with computer calculated values. The model employed is described and some modification were introduced in the resonance parameters of Th-232 to increase the agreement with the experimental value. (Atomindex citation 09:418491)

JAERI-M-7724 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Effect of Difference Between Group Constants Processed by Codes TIMS and ETOX on Integral Quantities.
H. Takano, Y. Ishiguro, and Y. Matsui. Jun 78, 78p

U.S. Sales Only.

Group constants of exp 235 U, exp 238 U, exp 239 Pu, exp 240 Pu and exp 241 Pu have been produced with the processing code TIMS using the evaluated nuclear data of JENDL-1. The temperature and composition dependent self-shielding factors have been calculated for the two cases with and without considering mutual interference resonant nuclei. By using the group constants set produced by the TIMS code, the integral quantities, i.e. multiplication factor, Na-void reactivity effect and Doppler reactivity effect, are calculated and compared with those calculated with the use of the cross sections set produced by the ETOX code to evaluate accuracy of the approximate calculation method in ETOX. There is much difference in self-shielding factor in each energy group between the two codes. For the fast reactor assemblies under study, however, the integral quantities calculated with these two sets are in good agreement with each other, because of eventual cancelation of errors. (Atomindex citation 10:455815)

JAERI-1259 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
LAMP-B: A Fortran Program Set for the Lattice Cell Analysis by Collision Probability Method.
K. Tsuchihashi. Feb 79, 82p
U.S. Sales Only.

Nature of physical problem solved: LAMB-B solves an integral transport equation by the collision probability method for many variety of lattice cell geometries: spherical, plane and cylindrical lattice cell; square and hexagonal arrays of pin rods; annular clusters and square clusters. LAMP-B produces homogenized constants for multi and/or few group diffusion theory programs. Method of solution: LAMP-B performs an exact numerical integration to obtain the collision probabilities. Restrictions on the complexity of the problem: Not more than 68 group in the fast group calculation, and not more than 20 regions in the resonance integral calculation. Typical running time: It varies with the number of energy groups and the selection of the geometry. Unusual features of the program: Any or any combination of constituent subprograms can be used so that the partial use of this program is available. (Atomindex citation 11:497536)

JAPFNR-487 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Assessment of Generation Method of Nuclear Reactor Constants Set Using the JENDL-2 Nuclear Data File.
H. Takano, M. Nakagawa, A. Hasegawa, Y. Ishiguro, and Y. Matsui. 1979, 67p JAERI-Memo-8233, PNC-J-250-79-13
Work performed under United States-Japanese Fast Reactor Exchange Program.
U.S. Sales Only.

Interpolation method of resonance shielding factor, group collapsing method with bilinear weight, and group structure were assessed for the purpose of generation of new nuclear reactor constants set using the JENDL-2 nuclear data file, and an adjustment plan was proposed for the methodology used. Concerned with the interpolation method of shielding factor, various methods used so far and, additionally, spline fitting method and Akima's method were intercompared in connection with computing accuracy and time. The spline method was found to give the most excellent and stable accuracy. Concerning the bilinear-weight collapsing method, the difference between the flux- and bilinear-weight collapsings was studied by considering a group collapse from seventeen to twenty-five groups and by analyzing reactivity worth measurements for sodium void at ZPPR-2 and steam entry at ZPR-9 Phase 1. The flux-weight collapsing method used so far was shown to be sufficient for the analysis of the measurement of sodium void reactivity worth. (ERA citation 05:010061)

18M. Reactors (Non-Power)

GKSS-78/E/45 PC **A02**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Zentralabteilung Forschungsreaktoren.
Present and Future of Research Reactors.
W. Krull. 1978, 16p
In German.
U.S. Sales Only.

The present uses of research reactors are outlined, and the problem of time availability and utilisation is discussed. The present problems of licensing, backfitting, object protection, and uranium supply are described, and the future prospects of research reactors are assessed on this basis. (Atomindex citation 10:459381)

19.

ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A086 546/9 MF **A01**
Ballistic Research Labs Aberdeen Proving Ground MD
An Analytical Model of Kinetic Energy Projectile/Fragment Penetration.
Final rept.,
John Zook. Oct 77, 130p Rept no. BRL-MR-2797
Availability: Microfiche copies only.

The basis for an analytic model of kinetic energy projectile (fragment) penetration is described. It is based on an expression for the resistive force encountered by a projectile during penetration. The predictive capability of the model is compared to that of the Thor equation for residual velocity. Some conclusions are drawn concerning the penetration process. A tabulation of computer programs and sample output are included. (Author)

AD-A086 737/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Dover NJ Applied Sciences Div
Cool Stick Propellant for 155mm M203 Propelling Charge.
Engineering study,
Aaron Grabowsky, Stanley Weiner, and Anthony J. Beardell. Apr 80, 48p Rept no. ES-1A-9-8357

A study was conducted to determine the benefits to be derived by replacing the M30A1 granular propellant in the M203 propelling charge by M31E1 stick-type propellant. Results of the study are: (1) The required projectile velocity and chamber pressure can be achieved using 29.3 lbs of M31E1 slotted stick propellant, (2) The pressure wave generation is at or below 1500 psi negative differential pressure, (3) Calculations show that flash will be eliminated, (4) Calculations show that blast overpressure reduction of about 12% can be achieved as a result of reduced muzzle energy due to the lower flame temperature propellant. Elimination of secondary flash may result in further blast reduction, (5) Gun tube wear life can be increased by as much as 100% based on the steel tube M199 cannon used in the M198 weapon, and (6) Recoil momentum (RM) is only slightly affected by the use of the cool M31E1 stick propellant charge. Calculations based on actual pressure-time traces show no increase in RM relative to the M203 charge) while the standard calculation shows an increase of 1.5%. The maximum allowable recoil is approximately 10% above the calculated values.

AD-A086 774/7 PC **A04**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Simulant Reaction Temperature Measurement via Telemetry for the XM736 at Charge 9.
Final rept.,
William P. D'Amico, Jr. May 80, 61p ARBRL-MR-03021, AD-E430 472
Supersedes Rept. no. ARBRL-IMR-639.

Six XM736 projectiles were fitted with a payload temperature measurement/telemetry system and fired at Charge 9 with flight times of approximately 100 seconds. Temperatures of the reaction produced by the liquid simulants were as high as 350 C during the terminal portions of the trajectory. These high temperatures may be related to recent base failures that occurred during safety tests.

AD-A086 850/5 PC **A05**/MF **A01**
IIT Research Inst Chicago IL
Squeeze Casting 81mm M374 Mortar Body and 155mm M483 Projectile Body Preform.
Final rept. 26 Sep 78-31 Mar 80,
S. Rajagopal, A. Chakravartty, and Duane Gustad. Jun 80, 82p IITRI-M6012-6, ARLCD-CR-80018, AD-E400 436
Contract DAAK10-78-C-0393

The project described in this report demonstrates the feasibility of squeeze casting two specific munitions components: the 81mm M374 mortar body and a preform for the 155mm M483 projectile body. Squeeze casting is a hybrid of conventional casting and forging techniques which involves one-step conversion of molten metal into near net-shape components or preforms. Also termed 'liquid metal forging,' this process involves pouring molten metal into metallic dies in a hydraulic press and solidifying the metal under high hydrostatic pressure through the application of direct press tonnage. In this program, both pearlitic malleable iron and ductile iron were evaluated for squeeze casting of the mortar body. Ductile iron proved to lend itself better to squeeze casting and was selected for optimization studies. The preform for the 155mm M483 body was squeeze cast from 1340 steel. The first phase of the program involved optimization of process parameters to produce consistently sound squeeze castings. The second phase examined the reproducibility off squeeze casting the mortar body through a 'pilot production' run which employed the optimized process parameters established in phase one. Both phases have been completed successfully and are described in this final report together with cost estimates for squeeze casting the mortar body on a production basis.

PAT-APPL-6-009 623 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Perfluorocarbon Vapor Tagging of Blasting Cap Detonators.
Patent Application,
R. N. Dietz, and G. I. Senum. Filed 6 Feb 79, 16p
Contract EY-76-C-02-0016
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A plug for a blasting cap is made of an elastomer in which is dissolved a perfluorocarbon. The perfluorocarbon is released as a vapor into the ambient over a long period of time to serve as a detectable taggant. (ERA citation 05:029571)

PATENT-4 168 191
Not available NTIS
Department of Energy, Washington, DC.
Thermally Stable, Plastic-Bonded Explosives.
Patent,
T. M. Benziger. Filed 29 Jun 78, patented 18 Sep 79, 6p PAT-APPL-920 415
Supersedes PAT-APPL-920 415-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

By use of an appropriate thermoplastic rubber as the binder, the thermal stability and thermal stress characteristics of plastic-bonded explosives may be greatly improved. In particular, and HMX-based explosive composition using an oil-extended styrene-ethylenebutylene-styrene block copolymer as the binder exhibits high explosive energy and thermal stability and good handling safety and physical properties. 6 claims. (ERA citation 05:029573)

SAND-79-0837 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.

Activities of the Deflagration-to-Detonation Transition Project. Quarterly Report, September–November 1978.
M. L. Lieberman. Apr 79, 46p
Contract EY-76-C-04-0789

A project has been initiated to address deflagration-to-detonation (DDT) transition as it applies to low voltage detonators. Studies with the relatively new DDT explosive CP are underway in the areas of physics of DDT, compatibility, and component development. In addition, materials studies are oriented towards the development of a similar, but safer, DDT explosive. The objective of the physics studies is to establish a modeling capability; a program to achieve this end has been outlined. Preliminary experiments have shown that ignition and deflagration can be observed optically through headers. Materials studies have commenced on (a) coating CP with secondary explosives and (b) synthesizing and evaluating compounds similar to CP. Continuing compatibility work has shown an absence of evidence of corrosive attack in Mini-Dets examined under optical microscopy. Activities on two CP-loaded detonators, the MC3423 and the MC3450, are described. For the first time, CP-loaded devices have been designed which achieve a 1 amp, 1 watt, 5 minute no-fire condition, while also achieving the all-fire conditions. Test devices for each application have yielded satisfactory output. Function times of approx. 10 mu s have been obtained with a Velonix bridgewire pulse of 15mJ. (ERA citation 04:052125)

SAND-79-1169C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Initiation of Granular Explosives by Ramp Waves.
R. E. Setchell. 1979, 22p CONF-790975-5
Contract EY-76-C-04-0789
CPIA-JANNAF combustion conference, Monterey, CA, USA, 10 Sep 1979.

Initiation processes in granular explosives experiencing finite-risetime loading, in contrast to shock loading, have been investigated experimentally. Ramp waves having a risetime of either 0.3 mu s or 0.8 mu s were transmitted into the explosive PBX-9404, resulting in initial waves having a peak axial stress of 5.1 GPa. The incident waves were generated in discs of a glass-ceramic, pyroceram, by planar impact of copper-faced projectiles using a gas-fired gun facility. Velocity interferometry (VISAR) was used to measure particle velocity histories after the initial wave had propagated through explosive samples having different thicknesses. For comparison, similar measurements were made for the case of shock loading to the same initial peak stress. The slower-rising ramp wave initially loads the explosive at an average rate of 7 GPa/mu s. The VISAR measurements show that initiation processes leading to detonation are strongly inhibited at such a rate of compression. After a propagation distance of 4.0 mm this ramp wave has steepened into a shock, but a relatively small rise in particle velocity following the shock suggests that little chemical energy has been released. Thus, velocity profiles measured up to this position provide detailed information on the mechanical characteristics of the unreacted explosive. After propagating 5.0 mm this wave has evolved into a stronger shock, with clear evidence of compressive disturbances being generated behind this wave. Comparisons between this profile and the shock-initiation profiles, however, show that shock loading results in much more rapid growth towards detonation. After propagating 3.0 mm the shock-input measurements show far more evidence of chemical energy release, with full detonation predicted for this case by 5.0 mm. (ERA citation 05:009040)

UCID-18280 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Plan for Studying the Thermo-Mechanical Parameters Which Influence Premature Ignitions in Artillary Projectiles Filled with Castable Secondary Explosives.
S. Sadik. 21 Sep 79, 38p
Contract W-7405-ENG-48

Thermo-mechanical parameters affecting premature ignitions are discussed. The factors required for ignition of Composition-B through gas compression and friction are discussed in detail. The thermal and mechanical properties which influence this proposed behavior are discussed. An integrated analytic and experimental effort to verify and quantify these proposed effects is discussed. (ERA citation 05:003568)

UCID-18333 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Performance and Properties of Extrusion Cast Explosives Composed of HMX, FEFO, and AFNOL.
J. S. Hallam. Oct 79, 38p
Contract W-7405-ENG-48

This report contains the results of a comprehensive program to develop a series of Extrusion Cast Explosives (ECX) composed of HMX and AFNOL, an energetic, cast-curable binder that is plasticized with FEFO. An ECX can be extruded into containers of almost any configuration and then cured in place without any shrinkage or loss of homogeneity. Early experiments showed that in the cured state ECXs are extremely insensitive to impact, and their composition can be adjusted to give different energies; a formulation containing 80 wt % HMX has the equivalent energy of PBX 9404. From this notable beginning the studies rapidly expanded into the important areas of mechanical properties, thermal stability, compatibility, and into more detailed studies of sensitivity and performance. Small channels filled with ECX are dependable, high-energy detonation trains. (ERA citation 05:009041)

19C. Combat Vehicles

AD-A086 337/3 PC **A05**/MF **A01**
Wayne State Univ Detroit MI
A Methodology for Estimating Mission Reliability,
Leonard R. Lamberson, and Kailash C. Kapur. 3 Mar 80, 76p TARADCOM-TR-12512
Contract DAAK30-79-C-0106

This research is specifically directed towards the application of techniques for estimating mission reliability where data is generated from proving ground or actual field testing. Three methodologies are refined for the typical Army vehicle testing situation. These are (i) failure data analysis, (ii) use of the exponential distribution, and (iii) use of the binomial distribution. Applicable approximations are explored for easy application along with typical examples of their use. (Author)

19D. Explosions, Ballistics, and Armor

AD-A086 615/2 PC **A02**/MF **A01**
McGill Univ Montreal (Quebec) Dept of Mechanical Engineering
On the Concept of the Critical Size od a Detonation Kernel,
John H. Lee, and K. Ramamurthi. 9 Sep 75, 12p AFOSR-TR-77-0559
Grant AFOSR-72-2387
Pub. in Combustion and Flame, v27 p331-340 1976.

No abstract available.

AD-A086 713/5 PC **A03**/MF **A01**
Delaware Univ Newark Applied Mathematics Inst
On the Initiation of Detonations in a One-Dimensional System.
Interim rept.,
Robert P. Gilbert. 1980, 30p TR-48A, AFOSR-TR-80-0499
Grant AFOSR-76-2879

The report is intended to provide Institute members with a concise discussion on the computation of the flow behind a shock leading to detonation in a one-dimensional system. The computation would be performed using the method of characteristics, and this reduction would also be used later for our investigation of the stochastic initiation of detonations. Stochastic effects might be introduced either as white noise or as variations in material properties such as so-called 'hot spots'. Mathematically these effects would appear as part of the 'driving terms' in the characteristic formulation. Consequently the purpose of the present report is to be viewed primarily as a supportive document for our research effort on the stochastic initiation of detonation.

AD-A086 775/4 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Effect of Near-Zero Spin on Instability of Controlled Projectiles in Ascending or Descending Flight.
Final rept.,
Charles H. Murphy, and James W. Bradley. May 80, 21p ARBRL-MR-03023, AD-E430 473

Lloyd and Brown have shown that constant-amplitude horizontal and vertical side forces applied to a spinning projectile can cause dynamic instability. A subsequent ARRADCOM report (AD-A072 808) removed some of the limitations of the Lloyd-Brown work and gave somewhat more general results. Unfortunately, these results were applied in the report to a case for which they were unsuitable; a nonspinning statically stable missile. The present report derives correct results for the zero-spin case and shows that the results of the earlier report are valid for spin rates greater than about five times the resonant spin value.

PB80-203938 PC **A02**/MF **A01**
Weapons Systems Research Lab., Adelaide (Australia).
Improvements to the NSWC Aerodynamics Prediction Program of Particular Significance for Bombs.
Technical rept.,
L. M. Sheppard. Mar 80, 22p WSRL-0146-TR, AR-001-970

During use of the NSWC missile aerodynamics prediction program, a number of deficiencies have been found. Because these deficiencies are important on bombs, simple but effective corrections have been devised. Details are given of a revised expression for boattail normal force at subsonic and transonic speeds. This is necessary because the program gives normal force results that are much too large in magnitude when the base diameter is small. Also included is a correction for boattail centre of pressure. In order to cope with fuses and lugs on bombs, allowances have been devised for truncated nose viscous separation pressure drag at subsonic and transonic speeds, and for excrescence drag at all speeds. The program includes an allowance for viscous separation drag at the nose shoulder, at transonic speeds. Finally, a correction has been included to account for the wave drag due to large amounts of nose blunting, including the region near the drag-rise Mach number. Comparisons are made with experimental data from a number of sources, in order to show that the modified program is effective and useful.

UCRL-82133 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Modeling of Inelastic Wave Propagation in Porous Rock.
J. A. Cheney, J. F. Schatz, and C. Snell. 3 Jan 79, 11p CONF-7904100-1
Contract W-7405-ENG-48
International conference on numerical methods in geomechanics, Aachen, F.R. Germany, Apr 1979.

Computer modeling of wave propagation in porous rock has several important applications. Among them are prediction of fragmentation and permeability changes to be caused by chemical explosions used for in situ resource recovery, and the understanding of nuclear explosion effects such as seismic wave generation, containment, and site hardness. Of interest in all these applications are the distance from the source to which inelastic effects persist and the amount of porosity change within the inelastic region. In order to study phenomena related to these applications, the Cam

Clay family of models developed at Cambridge University was used to develop a similar model that is applicable to wave propagation in porous rock. That model was incorporated into a finite-difference wave propagation computer code SOC. 10 figures, 1 table. (ERA citation 04:050639)

UCRL-83448 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Explosive-Induced Damage in Porous Sandstone.
A. S. Kusubov, W. B. Durham, R. N. Schock, J. F. Schatz, and T. J. Ahrens. 10 Oct 79, 8p CONF-790709-17
Contract W-7405-ENG-48
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

A combined laboratory and computational effort was conducted to study the effect of overburden pressures on explosively damaged porous sandstone. It was found that it was difficult to establish a dependence on confining pressure. The predominant effect of the explosion was compaction around the cavity, and macroscopic fractures were conspicuously absent. (ERA citation 05:005356)

19F. Guns

UCRL-82756 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Modeling Additive and Hostile Particulate Influences in Gun Combustion Turbulent Erosion.
A. C. Buckingham. 27 Sep 79, 19p CONF-790975-1
Contract W-7405-ENG-48
CPIA-JANNAF combustion conference, Monterey, CA, USA, 10 Sep 1979.

Research on fundamental mechanisms of erosion is the incentive for development and application of the numerical methods discussed. The methods link particulate statistical dynamics to continuum turbulent reactive flow and solid material dynamic (erosive) surface response. The modeling incorporates calculated thermal, chemical, and mechanical dynamic processes in solid, liquid, gas, and mixed phases. The calculations match the multicomponent, turbulent, chemically-reactive wall boundary layer with the unsteady eroding interface boundary using microscopic transport, accomodation and energy distribution sub-models. Gasborne particle motions are coupled to the turbulent flow in the inertial core and to the dissipative flow near the wall surface using two distinct numerical methods: (1) particulate turbulent gas flow, statistical dynamics and trajectory determination in the inertial core region; (2) solution of the detailed boundary layer heat and mass interface transport with boundary conditions and exchange properties modified for the unsteady influence of particle distributions and probabilistic surface dynamic response. Force, energy and motion coupling between particles and gas is assumed weak, with negligible back-influence from particles to gas flow structure. The analysis is restricted to low mass loading which may be found in the ullage region between propellant bed and bounding walls, propellant face and projectile base as well as between propellant base and breech. (ERA citation 05:001450)

19H. Underwater Ordnance

AD-A086 825/7 PC **A03**/MF **A01**
Naval Ocean Systems Center San Diego CA
The Detectability of a Mine Using Replica Correlation (RC) and Echo-Echo Correlation (EEC).
Research rept. Dec 79-Mar 80,
M. D. Green. Apr 80, 44p Rept no. NOSC/TR-535

The detectability of a small target by means of active sonar must be discussed in terms of waveform characteristics and the signal processing used to extract the echo from interference. This report presents the target signature of a mine for large bandwidth-time product (BT) waveforms, and discusses the losses suffered when the echo is processed by Replica Correlation (RC) and Echo-Echo Correlation (EEC). It is shown that RC 'splitting' losses increase with bandwidth, while EEC losses are relatively independent of bandwidth and are much lower than RC losses. The detectability of this mine for a given scenario of false alarm rate, number of beams, sonar platform motion, and processing type is also included. (Author)

20. PHYSICS

20A. Acoustics

AD-A086 394/4 Not available NTIS
Texas Univ At Austin Applied Research Labs
The Penetration of Highly Directional Acoustic Beams into Sediments.
Technical rept.,
Thomas G. Muir, Claude W. Horton, Sr., and Lewis A. Thompson. 1979, 38p Rept no. ARL-TR-80-19
Contract N00014-75-C-0161
Availability: Pub. in Jnl. of Sound and Vibration, v64 n4 p539-551 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 473/6 Not available NTIS
SACLANT ASW Research Centre La Spezia (Italy)
Use of Generalized Resolution Methods to Locate Sources in Random Dispersive Media,
Richard Klemm. 28 Aug 79, 11p Rept no. SACLANTCEN-SM-135
Availability: Pub. in IEE Proceedings, v127 ptF n1 p34-40 Feb 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 587/3 PC **A04**/MF **A01**
Naval Underwater Systems Center New London CT New London Lab
Analysis of Scattering and Radiation of Acoustic Waves from an Axisymmetric Structure in an Infinite Fluid Medium.
Technical rept.,
Jayant S. Patel. 27 Mar 80, 52p Rept no. NUSC-TR-5821

Analysis of scattering and radiation of acoustic waves from an axisymmetric structure in an infinite fluid medium is presented. It is shown that the use of a basis function, consistent with the one used for axisymmetric pressure on the finite surface, yields accurate results and uses fewer finite surface elements than does piston-type analysis. (Author)

AD-A086 648/3 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Mathematical Sciences
Simplified Calculation of Ray-Phase Perturbations due to Ocean-Environmental Variations.
Technical rept.,
W. L. Siegmann, M. J. Jacobson, and K. G. Hamilton. 1 Aug 79, 21p Rept no. RPI-MATH-126
Contract N00014-76-C-0288
Pub. in Jnl. of the Acoustical Society of American, v67 n4 p1193-1206 Apr 80.

No abstract available.

AD-A086 871/1 PC **A04**/MF **A01**
Texas Univ At Austin Applied Research Labs
Investigation of a Phase-Locked Loop Receiver for a Parametric Acoustic Receiving Array.
Technical rept.,
Robert A. Lamb. 5 May 80, 72p Rept no. ARL-TR-80-25
Contract N00024-77-C-6200

This report describes the investigation of a phase-locked loop (PLL) demodulator considered for use with the parametric acoustic receiving array (PARRAY). The PARRAY as an acoustic sensor is explained and the effects of longitudinal transducer motion on the PARRAY are described. This transducer vibration produces intermodulation products between the desired acoustic signals and the vibration induced signals. Both theoretical analysis and experimental data showing that the PLL demodulator can reduce this intermodulation in a PARRAY are given. Comparison is made between theoretically predicted PLL intermodulation reduction and measurements taken with simulated PARRAY signals. Also, experimental data are described showing the operation of the demodulator with a PARRAY undergoing transducer vibration. (Author)

AD-A086 884/4 PC **A02**/MF **A01**
California Univ Berkeley Electronics Research Lab
Dual-Gate Depletion-Mode DMOS Transistor for Linear Gain-Control Application,
Sze-Hon Kwan, C. T. Chuang, Richard S. Muller, and Richard M. White. 11 Sep 78, 8p AFOSR-TR-80-0520
Contract F44620-76-C-0100, Grant NSF-ENG78-21818
Pub. in IEEE Transactions on Electron Devices, vED-26 n7 p1053-1058 Jul 79.

No abstract available.

AD-A086 888/5 PC **A02**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab
An Electronically Addressed Bulk Acoustic Wave Fourier Transform Device,
B. A. Auld, D. W. Pettibone, J. D. Plummer, and R. G. Swartz. 1979, 6p GL-3035, AFOSR-TR-80-0528
Grant AFOSR-76-3059
Pub. in Ultrasonics Symposium Proceedings, p184-188 Sep 79.

No abstract available.

PB80-201155 PC **A03**/MF **A01**
Mississippi Univ., University. Physical Acoustics Research Group.
Amplification of Sound by Gas-Phase Reactions.
Technical rept. (Final) 1 Dec 78-31 Jan 80,
Henry E. Bass. Mar 80, 33p PARGUM-80-1, NSF/RA-800057
Grant NSF-ENG78-18078

This report describes an experimental investigation of sound amplification in a reacting gas mixture. The system chosen for study is the chlorine/hydrogen photo-initiated reaction involving four sequential chemical reactions. Initially, a sound pulse passes down a cylindrical sound tube in which the reaction has been started by a UV flash. The resulting flash increases pressure due to dissociation of chlorine and heating from subsequent exothermic reactions. Increased pressure in the illuminated part of the tube expands the gas moving towards both non-illuminated ends. Upon reaching the microphone, the expanded gas pressure suddenly increases, and this pressure wave is reflected from the microphone. Positive pressure pulse is followed by a decrease in pressure. Microphone output is recorded on FM tape for analysis and photography. The most serious problem encountered is the limited dynamic range of the microphones. The photoinitiated reaction provides the energy and mechanism for the observed amplification. Measured gain is L-8 at 2kHz compared to a gain of 4 predicted by theory. Results indicate that gas phase amplification of sound appears to be experimentally feasible.

20B. Crystallography

AD-A086 314/2 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center Watertown MA

Melt Growth of Nd :Y3A15O12 (Nd : YAG Using the Heat Exchanger Method (HEM),
Jaroslav L. Caslavsky, and Dennis J. Viechnicki.
11 Oct 78, 14p Rept no. AMMRC-TR-80-29
Pub. in Jnl. of Crystal Growth, v46 n5 p601-606 1979.

No abstract available.

AD-A086 342/3 PC **A04**/MF **A01**
Honeywell Corporate Technology Center Bloomington MN
Feasibility of Open Tube Slider Growth of HgCdTe from Te-Rich Solution.
Interim technical rept. Jan 79-Jan 80,
Joseph L. Schmit, and John E. Bowers. Feb 80, 65p AFWAL-TR-80-4068
Contract F33615-77-C-5142
See also Rept. no. AFML-TR-79-4036, AD-A071 094.

This report covers the feasibility demonstration of the growth of Hg1-x-CdxTe by liquid phase epitaxy from Te-rich solution at atmospheric pressure. Growth parameters are calculated from the phase diagram, measurement methods are described for determining layer thickness, uniformity, composition, and electrical properties. Substrate preparation and the growth process are described. Comparisons are made with growth from Hg-rich and HgTe-rich solutions. Layers as thin as 2 micrometers and as thick as 54 micrometers have been grown; most layers are 1 cm sq but some are 2x3 cm sq. We conclude that LPE growth is feasible from Te-rich solution at atmospheric pressure and are continuing our efforts to optimize the growth parameters and to increase the layer area. (Author)

AD-A086 741/6 PC **A06**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB OH
Impurity Studies in Single Crystal Cadmium Sulfide.
Final rept. 1966-1974,
Lawrence C. Greene. Dec 79, 125p Rept no. AFML-TR-79-4104

In cadmium sulfide crystals an easily observed and measured phenomenon is the low temperature bound exciton emission spectrum. The spectral lines are sharp, and their wavelength can be measured with considerable precision. The spectral position of the lines in a magnetic field can tell us much about the symmetry and structure of the center. The purpose of this work was to establish a relationship between the bound exciton spectra and defect or impurity structure of the crystal. A line associated with a neutral donor and a pair of lines associated with an ionized donor were found for the very purest material. A neutral donor was found for crystals equilibrated in hydrogen, and a pair of ionized donors for material equilibrated in hydrogen sulfide. Lithium doped crystals showed several pairs of ionized donor lines as well as a large number of characteristic neutral donor lines. Silver doping produced a large number of characteristic lines, but the nature of the associated centers has not been established. Sodium showed many characteristic lines, some associated with neutral donors, some with ionized donors, as well as lines clearly associated with complex structures. Potassium and rubidium both showed characteristic ionized donor lines. (Author)

AD-A086 751/5 PC **A04**/MF **A01**
Litton Systems Inc Morris Plains NJ Airtron Div
The Growth of Berlinite (AlPO4) Single Crystals.
Final rept. 1 Jul 77-30 Sep 79,
Larry E. Drafall, and Roger F. Belt. Mar 80, 75p RADC-TR-80-73
Contract F19628-77-C-0213

Single crystals of the berlinite mineral phase of anhydrous aluminum orthophosphate have been grown for possible surface acoustic wave applications. The desired piezoelectric form of AlPO4 is the alpha-phase which is stable from 130 to 580 C. A seeded hydrothermal growth technique was used. Nutrient was prepared by heating hydrated alumina and phosphoric acid in a sealed silver liner from 140 to 200 C at a rate of 5 deg/day and a 15 deg temperature gradient. Because AlPO4 has retrograde solubility, the nutrient was placed in a silver mesh basket in the upper, cooler portion of the liner with the seeds situated in the lower, hotter portion. A 20% free area baffle separated the two regions. Two basic techniques were used for the growth runs. The constant temperature method with a 10 C gradient produced rates of 23-25 mils/day. The rates could be varied significantly depending on such parameters as growth temperature, gradient, nutrient basket mesh size, seed orientation and baffle design. The second technique used increasing temperature at a rate of 5 C/day over the range of 140-200 C to obtain average growth rates of 22-32 mils/day. Seed orientation for most runs was (0001) plates. New growth of AlPO4 for the most part was clear and of fair quality.

INIS-mf-5416 PC **A07**/MF **A01**
Amsterdam Univ. (Netherlands).
Symmetry Properties of the Sixteen-Vertex Model.
A. Gaaff. 19 Sep 79, 129p
Proefschrift (Dr.).
U.S. Sales Only.

The qualitative symmetry properties of a general two-dimensional model, the sixteen-vertex model, are considered. This model admits a rich variety of interpretations. In fact, it can be considered as a kind of master-model, containing as special subclasses various well-known models for phase transitions, such as the Ising model of ferromagnetism both with and without an external field, the dimer model on a square lattice, the ice model and several ferro- and anti-ferro-electric models all of which are of interest in their own right, both theoretically and experimentally. (Atomindex citation 11:500584)

20C. Electricity and Magnetism

FRNC-TH-726 PC **A07**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Documentation.
Magnetic Measurements at 'GANIL' M-HALL Probe Utilization.
H. Znaidi. 127p
In French.
U.S. Sales Only.

This work was intended for developing a magnetic field measuring bench, and for investigating the various methods of magnetic measurements capable to answer the requirements from GANIL users: NMR, magnetoresistance, Hall probes, rotating coils. Two methods only are shown to fulfill the requirements from GANIL users: the Hall probe measuring method, and the method of the rotating coils. A great advantage of the Hall probe method is due to the simpleness of its electronic equipment, and the possibility of measuring fields with sharp variations in time, in view of the short response time of Hall effect. The method is most suitable for azimuthal measurements and determining heterogeneities in the magnetic field. A prevailing advantage of the rotating coil method is its linearity due to the direct read-out of the magnetic field with using a single constant over the whole range of measurement. The method is most suitable for fieid differential measurements. (Atomindex citation 09:412081)

INIS-mf-4301 PC **A04**/MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Application of the Analytical Regularization for the Casimir Forces.
J. R. Ruggiero. 1977, 56p
In Portuguese.Thesis.
U.S. Sales Only.

A study of the zero point energy problem between conductors is made. In particular, the Casimir effect, which is the attraction force between two parallel conductor plates, is discussed. (Atomindex citation 09:384249)

20D. Fluid Mechanics

AD-A086 311/8 Not available NTIS
California Inst of Tech Pasadena
The Similarity Solution for a Bore on a Beach,
J. W. Barker, and G. B. Whitham. Oct 79, 14p
Sponsored by Office of Naval Research, Arlington, VA.
Availability: Pub. in Communications on Pure and Applied Mathematics, v33 p447-460 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A086 370/4 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
The Convergence of Periodic Waves to Solitary Waves in the Long Wave Limit.
Technical summary rept.,
J. F. Toland. Mar 80, 53p Rept no. MRC-TSR-2054
Contract DAAG29-75-C-0024

It is shown that large amplitude solitary waterwaves arise as the limit of periodic waves whose wavelengths increases indefinitely. This results is obtained after a new version of the Nekrasov integral equation for periodic waves has been derived. Its resemblance to the equation for solitary waves (1) leads to this convergence results once the global existence proof for solitary waves given in (1) has been taken into account. (Author)

AD-A086 445/4 PC **A03**/MF **A01**
Tel-Aviv Univ (Israel) School of Engineering
On the Spreading Rate and Structure of a Turbulent Spot.
Final rept. 1 Mar 79-29 Feb 80
I. Wygnanski, and J. Haritonidis. 19 Mar 80, 46p AFOSR-TR-80-0472
Grant AFOSR-77-3275

Velocity measurements in the plane of symmetry of a turbulent spot are reported. The number of data points taken at various streamwise locations was adequate to map the ensemble-averaged flow field in a spot at a given instance. These results are compared to velocity taken in laboratory coordinates (i.e., at a given station with variable time), whereupon it is shown that the flow field in the spot depends either on its distance from its origin or on the time elapsed from its initiation. The two variables are not independent, so the flow may be transformed into a time (space) independent problem. The dependence of the spot on the Reynolds number and on the surrounding laminar boundary layer is established. The effects of these parameters on the shape of the ensemble-averaged spot, its size, characteristic celerities, and relative rate of entrainment, are discussed. (Author)

AD-A086 659/0 PC **A02**/MF **A01**
Pittsburgh Univ PA Dept of Mathematics and Statistics
Analysis of Numerical Methods for the Equations of Fluid Dynamics.
Final rept.,
C. A. Hall, and T. A. Porsching. Jun 80, 6p
AFOSR-TR-80-0543
Contract F49620-79-C-0100

During the last twenty-five years, the published literature on computational fluid dynamics has grown enormously. However, there are few papers dealing with the analysis of computational methods for time dependent multidimensional flow. There also seems to be a polarization of investigators into two groups: advocates of finite difference methods and advocates of finite element methods. It is our contention that an 'ideal' computational model for fluid flow problems may in fact draw on the strengths of both schools of thought. For example, we have recently implemented a frontal solution technique, originally devised for finite element analyses, in a finite difference model of two-phase fluid flow. (Author)

AD-A086 664/0 PC **A03**/MF **A01**
Dayton Univ OH Research Inst
The Stability of a Compressible Free Shear Layer.
Final technical rept. Jan-Sep 78,
David F. Roscoe, and Wilbur L. Hankey. Oct 79, 50p AFWAL-TR-80-3016

Contract F33615-76-C-3145

Inviscid flows with an inflection point in the velocity profile have been identified by Lord Rayleigh (1880) to be unstable. Michalke (1964) computed the amplification factors of the instability for a shear layer in incompressible flow. This report extends this work to include compressible flows. The results indicate large amplification rates occur through the transonic range but reduce drastically for supersonic flows. (Author

AD-A086 715/0 PC **A17**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Turbulent Boundary Layers - Experiments, Theory and Modelling.
Conference proceedings.
Jan 80, 389p Rept no. AGARD-CP-271
Presented at the Fluid Dynamics Panel Symposium, The Hague, Netherlands, 24-26 Sep 79.

Recent experiments have demonstrated the persistence of coherent structures in turbulent shear flows and consequently have cast doubt on the usual local transport relations and even on the usefulness of Reynolds averaging, used in practically all modelling approaches. This symposium takes stock of the present situation in turbulence research and attempts to map out new directions in modelling and experimentation. It deals specifically with turbulent boundary layers, in both incompressible and compressible fluid flow. The existence coherent vortex structures has led to renewed interest in Lagrangean descriptions of the flow. Current work emphasizes flow-visualization methods together with development of sophisticated conditional sampling methods in hot-wire anemometry. Experimentalists have taken up the challenge presented by the existence of coherent structures, and new results are reported. Theoreticians interested in these new results face the difficult task of coming to grips with nonlinear vortex interactions. Development of a physically satisfactory and mathematically tractable theory is a formidable task. The decomposition of a fluctuating flow field into waves is a traditional, familiar approach while decomposition into horseshoe vortices (say) presents conceptual as well as mathematical difficulties. Computer modelling of turbulent shear flows using Reynolds averaged equations with various closure schemes is the most useful technique presently available. However, sooner or later, modelling will have to recognize the experimental fact of coherent structures.

AD-A086 831/5 PC **A04**/MF **A01**
Flow Research Co Kent WA
Visualization Study of Turbulent Spots.
Interim technical rept. 1 May 78-30 Apr 80,
Mohamed Gad-el-Hak, and James J. Riley. 1 May 80, 60p FLOW-RR-162, AFOSR-TR-80-0473
Contract F49620-78-C-0062

An investigation of turbulent spots evolving in a laminar boundary layer has been conducted during the period 1 May 1978 - 30 April 1980. A flat plate was towed through an 18 m water channel. The plate was mounted under a carriage that was towed at a constant velocity. The carriage rides on a continuously replenished oil film giving a vibrationless tow. Turbulent spots were initiated by a solenoid valve that ejected a small amount of water through a hole located downstream from the leading edge. A novel visualization technique has been employed that utilizes fluorescent dye excited by a sheet of laser. Some aspects of entrainment and structure of turbulent spots were inferred from the present experiments. In particular, the present results strongly suggest that another mechanism, in addition to entrainment, is needed to explain the lateral growth characteristics of the turbulent zone defining the spot. This mechanism, termed growth by destabilization', appears to be a result of the turbulence in the spot destabilizing the unstable laminar boundary layer in the neighborhood of the spot. Two additional tasks were carried out as part of this investigation. The first, a theoretical study of three-dimensional wave packets; and the second an investigation of the effects of drag reducing polymers and stratification on turbulent spots. (Author)

CEGB-RD/B/N-4341 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.
On-Line Pressure Measurement Using Scanning Systems.
A. G. Morss, and A. P. Watson. Aug 78, 16p
U.S. Sales Only.

Data collection methods can be improved significantly by using pressure scanning systems in conjunction with transducers for the measurement of pressure distribution in fluid flow rigs. However, the response of pressure transducers to the slight random pressure fluctuations that occur in practice can cause some measurement problems, especially for accurate work. The nature of these pressure fluctuations is examined and suitable analysis techniques are recommended. Results obtained using these techniques are presented. It is concluded that by using the correct techniques pressure transducer systems can be used to measure pressure distributions accurately and are sufficiently sensitive to measure very small systematic effects with great precision. (Atomindex citation 10:459550)

CNEN-RT/ING-78-18 MF **A01**
Comitato Nazionale per l'Energia Nucleare, Rome (Italy).
Comparative Analysis of Heat Transfer Correlations for Forced Convection Boiling.
G. Guglielmini, E. Nannei, and C. Pisoni. 1978, 60p
In Italian.
U.S. Sales Only. Microfiche copies only.

A critical survey was conducted of the most relevant correlations of boiling heat transfer in forced convection flow. Most of the investigations carried out on partial nucleate boiling and fully developed nucleate boiling have led to the formulation of correlations that are not able to cover a wide range of operating conditions, due to the empirical approach of the problem. A comparative analysis is therefore required in order to delineate the relative accuracy of the proposed correlations, on the basis of the experimental data presently available. The survey performed allows the evaluation of the accuracy of the different calculating procedure; the results obtained, moreover, indicate the most reliable heat transfer correlations for the different operating conditions investigated. This survey was developed for five pressure range (up to 180bar) and for both saturation and subcooled boiling condition. (Atomindex citation 11:497044)

CONF-741270-P1 PC **A99**/MF **A01**
Canterbury Univ., Christchurch (New Zealand).
Fifth Australasian Conference on Hydraulics and Fluid Mechanics.
D. Lindley, and A. J. Sutherland. 1974, 644p
Australasian conference on hydraulics and fluid mechanics, Christchurch, New Zealand, 9 Dec 1974.
U.S. Sales Only.

Seventy-six papers that were presented at the meeting are included in Volume I. A separate abstract was prepared for each of four papers. The remaining 72 papers were not in scope for the data base. (ERA citation 04:026175)

FEI-732 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Measuring Local Steam Content Near a Heat-Generating Surface in Water Boiling in a Large Volume.
A. A. Tsyganok, D. N. Sorokin, Yu. P. Dzhusov, N. N. Mityaev, and A. A. Gribov. 1977, 19p
In Russian.
U.S. Sales Only.

The results of the experimental research of the variation of the local steam content at various heights and in the vicinity of the heat-emission surface during boiling of water in a large volume at the atmospheric pressure, are given. It has been established that in the vicinity of the heat-emission surface there is a thin layer, which is enriched with the liquid and primarily determines the heat emission. On the basis of the experimental data, it has been shown that the average area steam content agrees with the part of the surface in a definite cross-section which is occupied by the steam. There has been obtained a formula for the effective thickness of the layer inriched by the liquid which, at certain assumptions, is consistent with the experimental data on the value of sigmasub(max) at the height revealing the maximum steam content. (Atomindex citation 10:430490)

FEI-753 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Calculated and Experimental Definition of Boundary Layer Characteristics in Natural Convection in a Closed Volume.
A. N. Opanasenko, and N. N. Shan'gin. 1977, 11p
In Russian.
U.S. Sales Only.

The characteristics of the boundary layer in a closed volume under the 2nd type boundary conditions have been numerically and experimentally determined. The test results prove transition to quasi-stationary conditions of free convection and are well consistent with the data relating to convection structure in the cylindrical and spherical volumes. Stratification of the liquid in the upper portion, for example, in the nuclear reactor with integral arrangement, results in complicated natural circulation of the coolant under the transient conditions. (Atomindex citation 10:430477)

FRNC-TH-816 PC **A07**/MF **A01**
Paris-6 Univ. (France).
Experimental Study of the Mechanisms of High Intensity Laser-Plasma Interaction from the Spectral Analysis of Reflected Laser Radiation.
C. Garban. 1977, 146p
In French.These (3e Cycle).
U.S. Sales Only.

This thesis aims to study experimentally reflected laser radiation in a CO sub 2 laser interaction experiment with a polyethylene plane target. The balance of energy reflected in all directions provides a measure of the total absorption. The spectral analysis of this radiation is a diagnosis of certain interaction mechanisms and of a few plasma parameters. In particular, the stimulated Brillouin backscattering is evidenced from the analysis of the spectra at the fundamental frequency of the laser, as are certain parametric instabilities involved in the generation of 3/2 omega and 3 omega harmonics of the fundamental frequency. It is proposed to study in succession some theoretical aspects of the interaction mechanisms which modify the spectral profile of the incident wave: phase and amplitude modulations of a wave spreading in a medium with a variable index, Doppler effect, parametric instabilities and harmonics generation modes. The experimental rig is then described: CO sub 2 laser, experimental chamber, measurement of the focal spot, detectors, spectroscope and other diagnostic equipment associated with the experiment. The experimental study of the laser power reflected at 10.59 mu and its interpretation with the reverse bremsstrahlung are given, as are the experimental results achieved in the laser-plasma interaction experiment, on the analysis of the radiation reflected at the fundamental frequency and its 3/2 omega sub 0 , 2 omega sub 0 and 3 omega sub 0 harmonics. Finally, the utilization of the preceding results as diagnostics of the laser-matter interaction is discussed. (Atomindex citation 11:501018)

INIS-mf-4386 PC **A04**/MF **A01**
Karlsruhe Univ. (Germany, F.R.). Inst. fuer Reaktortechnik.
Study of the Condensation of Saturated Steam in a Water Pool by Means of High-Speed Motion Pictures.
M. Engeldinger. Apr 77, 70p
In German.Diploma thesis.
U.S. Sales Only.

On condensation of saturated steam in a water pool (mixing condensation) there will be produced oscillations in the water phase which can be measured as pressure variations on the enclosing walls. Height and shape of the pressure changes allow conclusions as to the different phases of mixing condensation. With the aid of high-speed motion pictures of one- and two-pipe configurations of 80 mm diameter a correlation is found between phenomenology and pressure measurement. The fol-

lowing parameters are included in the study: water temperature, steam mass flow, and - pipe configuration. It is investigated how these parameters influence low pressure and overpressure and the formation of pressure peaks of high frequency. (Atomindex citation 09:398643)

NUREG/CR-1554 PC **A05**/MF **A01**
State Univ. of New York at Stony Brook. Dept. of Mechanical Engineering.
On the Motions of Particles in Turbulent Flows.
Topical rept.,
S. L. Lee, and F. Durst. Jul 80, 81p
Prepared in cooperation with Karlsruhe Univ. (Germany, F.R.).

The present paper describes theoretical and experimental studies of the behavior of turbulent particle dispersion flows. In particular, dispersions of low particle concentration are considered in a turbulent pipe flow and the particle deposition at the wall is studied. The theoretical treatment is based on an analysis of the particles' frequency response to the surrounding eddy motion. A scheme is developed to determine the location of the joining boundary between two distinguishable regions of the particle transport; a turbulent diffusion controlled region and a region in which the particle motion is controlled by the mean velocity field of the fluid as in laminar flows. The paper also gives first results of experimental investigations carried out in an upward turbulent air flow in a verticle pipe-test-rig. Measurements were carried out for various sizes and it is shown that the results qualitatively support the theoretical findings.

N80-27286/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
An Alternative Approach to the Numerical Simulation.
G. M. Johnson. Jun 80, 8p NASA-TM-81542
Presented at 7TH Intern. Conf. On Numerical Methods in Fluid Dyn., Stanford, Calif., 23-27 Jun. 1980; Sponsored by Naca, AFOSR, NSF, and Onr.

A numerical procedure for the efficient simulation of steady inviscid flow is described and its utility demonstrated. Application of the surrogate equation technique allows the formulation of stable, fully conservative, type dependent finite difference equations for use in obtaining numerical solutions to systems of first order partial differential equations, such as the steady state Euler equations or their various approximations. Computational results are presented for the full Euler equations and for the transonic disturbance equations. For the latter case, a computational efficiency greater than that obtained by means of the standard perturbation potential approach is indicated.

PB80-203540 PC **A16**/MF **A01**
Arizona State Univ., Tempe. Engineering Research Center.
Heat Transfer Characteristics of the Two-Phase Closed Thermosyphon (Wickless Heat Pipe) Including Direct Flow Observation.
Final rept.,
F. E. Andros, and L. W. Florschuetz. Apr 80, 367p ERC-R-80019
Grant NSF-ENG75-09072

In Part I a visual study of an annular two-phase closed thermosyphon (wickless heat pipe) is reported. The heat transfer surface was stainless steel. Working fluids were Freon-113, ethanol, and water. Photographs of pertinent phenomena are included. The visual observations were used to interpret the measured heat transfer characteristics. For small and intermediate liquid fill quantities four flow regimes were observed in the evaporation section, in addition to nucleate boiling in the liquid pool: (1) a smooth continuous film with surface evaporation; (2) breakdown of the film into stable rivulets; (3) a wavy film with unstable rivulets; and (4) a wavy film with bubble nucleation in the unstable rivulets. Three different types of 'dry-out' conditions (heat transfer limits) were also observed and are reported in detail. In Part II results obtained for a stainless steel tubular opaque device with Freon-113 as a working fluid are reported. This device was designed to permit a larger range of geometric configurations (heated length, adiabatic length, cooled length, and angle of inclination). Both steady state heat transfer characteristics and heat transfer limits are reported in detail. In Part III, results from the visual and opaque devices are compared and discussed. The present results are compared with those of other investigations, and conclusions and recommendations are drawn.

PB80-205156 PC **A15**/MF **A01**
Arizona State Univ., Tempe. Engineering Research Center.
Laminar Film Flow Phenomena--Theory and Application to the Two-Phase Closed Thermosyphon.
Final rept.,
R. T. Hirshburg, and L. W. Florschuetz. May 80, 344p ERC-R-80020
Grant NSF-ENG75-09072

In Part I the hydrodynamic and thermal characteristics of thin, laminar wavy-film flow are considered. A theoretical model is developed to predict the hydrodynamic features of asymptotic wavy-flow states. The mathematical closure question arising in asymptotic-state analyses is satisfactorily resolved here for the first time. The model accurately predicts published experimental data for mean film thickness, trough-to-crest dimension, wave celerity, and wavelength. The Nusselt theory for laminar film condensation is shown to significantly under-predict existing experimental data due to the presence of waves on the condensate film surface. Consequently, a heat transfer model is developed incorporating the wavy-film hydrodynamic model results. The subsequent predictions agree well with experimental data and, in addition, indicate the appropriate data trend with flow length. In Part II other thin film phenomena are described, including continuous-film breakdown, rivulet flow, and sputtering. All of these phenomena are present in the operation of a heat transfer device known as the two-phase closed thermosyphon (wickless heat pipe). This device was experimentally investigated. Parameters of investigation include the tube material, working fluid, fill quantity, heat flux, condenser/adiabatic/evaporator section lengths, condenser temperature, and tube inclination.

PB80-813504 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Cavitation Flow. 1976-May, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1976-May 80,
Gerald F. Zollars. Jul 80, 152p
Supersedes NTIS/PS-79/0652. Sponsored in part by National Technical Information Service, Springfield, VA.

These citations from the international literature concern various aspects of cavitation flow. Articles dealing with bubble behavior relating to two phase flow, oscillating flow, unsteady flow, wall flow, and flow stability are cited. (This updated bibliography contains 348 citations, 154 of which are new entries to the previous edition.)

PNL-SA-7952 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Overview of US Research Activities in the Dispersion of Dense Gases.
D. J. McNaughton, and C. M. Berkowitz. Aug 79, 41p CONF-790993-1
Contract EY-76-C-06-1830
Symposium on dense gas, Frankfurt, F.R. Germany, 3 Sep 1979.

Progress is reported in the understanding of dense gas dispersion through application of theory from other disciplines and preliminary experimentation particularly in the area of LNG. Future efforts should be directed to providing generalizations that can be expanded to all hazardous dense gases and to reducing uncertainties in dense gas models. Specific suggestions are made for research applicable to dense gas dispersion. (ERA citation 05:006179)

SAND-79-0893 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
Introduction to Computational Techniques for Boundary Layers.
F. G. Blottner. Sep 79, 84p
Contract EY-76-C-04-0789

Finite-difference procedures to solve boundary layer flows in fluid mechanics are explained. The governing equations and the transformations utilized are described. Basic solution techniques are illustrated with the similar boundary layer equations. Nonsimilar solutions are developed for the incompressible equations. Various example problems are solved, and the numerical results in the Fortran listing of the computer codes are presented. (ERA citation 05:002028)

SAND-79-1373C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Finite Element Analysis of Volumetrically Heated Fluids in an Axisymmetric Enclosure.
D. K. Gartling. 1979, 9p CONF-7906129-1
Contract EY-76-C-04-0789
International symposium on finite element methods in flow problems, Banff, Alberta, Canada, 10 Jun 1979.

A general purpose finite element computer code has been used to analyze the steady state and transient response of a confined fluid that is heated volumetrically. The numerical procedure is demonstrated to be capable of resolving flow fields of considerable complexity without undue computational expense. Results are discussed for a Grashof number range (4.0 x 10 exp 4 to 4.0 x 10 exp 6) in which the flow varies from a steady, single cell configuration to a multiple cell configuration that includes a periodic interaction. (ERA citation 04:057028)

20E. Masers and Lasers

AD-A086 401/7 PC **A03**/MF **A01**
Naval Surface Weapons Center Silver Spring MD
Influence of Wall Impedance on the Electron Cyclotron Maser Instability.
Final rept.,
Han S. Uhm. 1 Mar 80, 50p Rept no. NSWC/TR-80-131

The influence of finite wall impedance effects on the cyclotron maser instability of a hollow electron beam is investigated. The stability analysis is carried out within the framework of the linearized Vlasov-Maxwell equations, assuming that the beam thickness is much less than the radius of the beam. The formal dispersion relation for azimuthally symmetric electromagnetic perturbations is obtained, including the influence of an arbitrary value of wall impedance. One of the most important features of this analysis is that, for a purely resistive wall, the growth rate of instability is substantially reduced by allowing even a very small amount of resistivity. Moreover, the range of axial wave-numbers corresponding to instability increases rapidly as the wall resistivity is increased. Cyclotron maser stability properties in a dielectric loaded waveguide is also investigated. It is shown that by an appropriate choice of the dielectric constant epsilon and thickness of dielectric material, the bandwidth of instability can be increased more than twice of that for a plain conducting waveguide. (Author)

AD-A086 412/4 PC **A02**/MF **A01**
Rochester Univ NY Dept of Physics and Astronomy
Bistability and Intensity Fluctuations in Zeeman Lasers and Amplifiers.
Surendra Singh. 2 Oct 79, 7p AFOSR-TR-80-0429
Grant AFOSR-76-2918
Pub in Optics Communications, v32 n2 p339-344 Feb 80.

No abstract available.

AD-A086 429/8 PC **A02**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab
Stable Single-Axial-Mode Operation of an Unstable-Resonator Nd:YAG Oscillator by Injection Locking.
Y. K. Park, G. Giuliani, and R. L. Byer. 16 Nov 79, 4p GL-3077, AFOSR-TR-80-0432
Contract F49620-77-C-0092
Pub. in Optics Letters, v5 n3 p96-98 Mar 80.

No abstract available.

AD-A086 431/4 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Atomic-Transition Lasers Based on Two-Photon Dissociation of Metal-Triiodide Vapors.
Journal article,
Thomas F. Deutsch, Daniel J. Ehrlich, and Richard M. Osgood, Jr. 17 Jul 79, 4p JA-5004, ESD-TR-79-300
Contract F19628-80-C-0002
Pub. in Optics Letters, v4 n11 p378-380 Nov 79.

No abstract available.

AD-A086 495/9 PC **A07**/MF **A01**
Illinois Univ At Urbana-Champaign Electro-Physics Lab
Optically Pumped Far Infrared Molecular Lasers.
Final rept. 1 Feb 76-31 Jan 80,
Paul D. Coleman. Apr 80, 138p UILU-ENG-80-2540, AFOSR-TR-80-0441
Grant AFOSR-76-2988

This report summarizes studies on optically pumped far infrared molecular gas lasers. The research has been concerned with the general subjects of far infrared integrated optics and technology, the discovery of new optically pumped molecular laser systems, and the study and analysis of nonlinear processes (Raman and hyper-Raman) that can occur in optically pumped systems. The theoretical density matrix analysis of the gain spectra of nonlinear systems and the first detailed experimental measurements of these systems are presented. It is demonstrated that third and fifth order nonlinear processes can exceed first order laser processes. An experimental study of the generation of a 22.653 GHz signal (the largest wavelength yet reported) in optically pumped NH3 is described. The frequency tunability and single shot spectral characteristics of the signal were measured with precision. A single laser pump in a four-level system can yield two laser signals, which in the linear case are not coupled together. However, with stronger pumping, nonlinear effects can couple the two laser signals with the result that the behavior of one laser signal is determined by the other and vice versa. The self-consistent analysis of this problem is described.

AD-A086 552/7 PC **A06**/MF **A01**
Defense Intelligence Agency Washington DC
Bibliography of Soviet Laser Developments. Number 42, July-August 1979.
May 80, 113p Rept no. DIA-DST-2700Z-003-80
See also AD-A080 733.

This is the Soviet Laser Bibliography for July-August 1979 and is no. 42 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics. (Author)

AD-A086 553/5 PC **A07**/MF **A01**
Defense Intelligence Agency Washington DC
Bibliography of Soviet Laser Developments. Number 43, September-October 1979.
Jun 80, 140p Rept no. DIA-DST-2700Z-004-80
See also AD-A086 552.

This is the Soviet Laser Bibliography for September-October 1979 and is no. 43 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics. (Author)

AD-A086 623/6 PC **A02**/MF **A01**
Cornell Univ Ithaca NY Dept of Chemistry
The Temperature Dependence of Absolute Rate Constants for the F + H2 and F + D2 Reactions.
E. Wurzberg, and P. L. Huston. 2 Oct 79, 6p AFOSR-TR-80-0492
Grant AFOSR-78-3513
Pub. in Jnl. of Chemical Physics, v72 n9 p4811-4814, 1 May 80.

No abstract available.

AD-A086 657/4 PC **A04**/MF **A01**
United Technologies Research Center East Hartford CT
Calculation of the Energetics and Collision Dynamics of Electronic Transition Lasers.
Final rept. 1 Apr 77-31 Mar 30,
H. Harvey Michels, and R. H. Hobbs. May 80, 55p UTRC/R80-922853, AFOSR-TR-80-0537
Contract F49620-77-C-0064

This research develops techniques and computational schemes for a priori prediction of the kinetics and the product distribution of atomdiatom reactions. This involves (1) improved calculation techniques for potential energy surfaces for the reactants and products; (2) quantum and classical mechanical calculations of the dynamics of the reaction; and (3) detailed calculations for systems with high potential as electronic transition lasers.

AD-A086 670/7 PC **A03**/MF **A01**
Rochester Univ NY Lab for Laser Energetics
Development of X-Ray Laser Media: Measurement of Gain and Development of Cavity Resonators for Wavelengths Near 130 Angstroms.
Annual rept. 1 Nov 78-31 Dec 79,
James M. Forsyth. Feb 80, 34p AFOSR-TR-80-0503
Grant AFOSR-77-3189

A new experimental facility was used to explore a range of conditions under which inverted populations on soft x-ray transitions could be produced in laser heated plasmas. Direct measurements with grating spectrographs were performed in the vicinity of 130 angstroms to develop the diagnostic techniques for gain determination. Designs for reflectors suitable for use in cavity resonators at soft x-ray wavelengths were developed. Construction of apparatus to produce such reflectors was begun. A patent on the reflector design was applied for. (Author)

AD-A086 688/9 PC **A02**/MF **A01**
Columbia Univ New York Dept of Electrical Engineering and Computer Science
High Power Submillimeter and Infrared Radiation from Intense Relativistic Electron Beams.
Final rept. 1 Jan 75-31 Dec 79,
S. P. Schlesinger, T. C. Marshall, and P. Diament. Mar 80, 11p AFOSR-TR-80-0545
Contract F44620-75-C-0055

A series of experiments was performed to test the dependence of superadient power generated by stimulated Raman backscattering (at 2 mm wavelength) upon ripple-field amplitude and length. Experiments were also performed to understand the possibility of using distributed feedback in a collective mode free electron laser. A theoretical study was completed to understand the growth of circular waveguide modes by parametric coupling to cold beam waves, with field gradients included. This is similar to free electron laser configurations to be studied in upcoming experiments. (Author)

AD-A086 698/8 MF **A01**
Georgia Inst of Tech Atlanta School of Physics
Cross Sections for Ionization of Rare Gas Excimers by Electron Impact and Atomic and Molecular Processes in Excimer Lasers.
Final rept. 1 Apr 78-30 Sep 79,
M. Raymond Flannery, and K. J. McCann. Mar 80, 121p AFWAL-TR-80-2015
Contract F33615-78-C-2028
Availability: Microfiche copies only.

Theoretical cross sections for ionization of metastable excimers - helium, neon, argon, krypton and zenon - and of metastable mercury are presented. Systematic trends in inelastic form factors and Born cross sections for collisional transitions between excited neighboring levels of atoms are discovered and discussed. Key cycles of atomic and molecular collision processes in excimer lasers are delineated and discussed. (Author)

AD-A086 764/8 PC **A02**/MF **A01**
Pittsburgh Univ PA
Atomic and Molecular Processes.
Final rept. 1 Jul 75-15 May 80,
M. A. Biondi. 25 Jun 80, 6p
Contract N00014-76-C-0098, ARPA Order-2686

The topics investigated experimentally and theoretically by the Pittsburgh Atomic Sciences Institute with applications to high power laser development and atmospheric IR backgrounds are enumerated. Reports containing the detailed scientific progress in these studies are cited. Finally, a list of the journal articles describing the results of the programs, with full references, is given. (Author)

AD-A086 776/2 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Slow Wave Cyclotron Instability in Dielectric Loaded Waveguide of Rectangular Cross-Section.
Final rept.,
A. K. Ganguly, and K. R. Chu. 18 May 80, 21p
NRL-MR-4215, AD-E000 468

Slow wave cyclotron instability in dielectric loaded waveguides driven by an anisotropic velocity distribution is considered. The spatial growth rate of the radiation field is calculated by deriving a dispersion relation of the waveguide modes in the presence of a weak electron beam. It is shown that broad band amplification is possible in such structures. Bandwidth in excess of 60% is obtained for a 'cold' beam. The bandwidth decreases with increase in the velocity spread of the electrons. At 5% velocity spread, the bandwidth decreases to 12%. The dependence of the gain and bandwidth on other material and electron beam parameters as well as the applied magnetic field is discussed. (Author)

AD-A086 856/2 PC **A04**/MF **A01**
United Technologies Research Center East Hartford CT
Short Pulse UV-Visible Waveguide Laser.
Final technical rept. 15 May 79-14 May 80,
Leon A. Newman. 1 Jul 80, 72p Rept no. UTRC-R80-924636-1
Contract N00014-79-C-0309

The operation of a N2(+) ion waveguide laser (4278 A) excited by charge transfer from He2(+) created in a capacitively coupled self-sustained discharge is described. In addition, the results of an experimental diagnostic program and a computer modeling program, conducted to explain the general operations of the discharge pumped He-N2 system, are presented. The results of this program indicate upper laser level electron quenching and lower level pumping may be seriously limiting the achievable laser efficiency of this system.

DOE/DP/40100-1 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Applied Quantum Chemistry Advanced Laser Development. Final Progress Report, 1 October 1978-30 September 1979.
M. Krauss, W. J. Stevens, P. S. Julienne, and F. H. Mies. Nov 79, 30p
Contract AI08-79DP40100

The included summaries are divided into three categories. First, the theoretical analyses of Raman processes in intense fields are described. Second, the electronic structure calculations are presented with a brief description of pseudopotential code development. Third, the analysis of absorption processes, both collision-induced and photoionization, and energy transfer processes is presented. (ERA citation 05:024522)

PAT-APPL-6-028 740 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
High Energy KrCl Electric Discharge Laser.
Patent Application,
R. C. Sze, and P. B. Scott. Filed 10 Apr 79, 6p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A high energy KrCl laser is presented for producing coherent radiation at 222 nm. Output energies on the order of 100 mJ per pulse are produced utilizing a discharge excitation source to minimize formation of molecular ions, thereby minimizing absorption of laser radiation by the active medium. Additionally, HCl is used as a halogen donor which undergoes a harpooning reaction with metastable Kr/sub M/ to form KrCl. (ERA citation 05:029465)

PAT-APPL-6-028 778 PC **A02/MF A01**
Department of Energy, Washington, DC.
High Energy XeBr Electric Discharge Laser.
Patent Application,
R. C. Sze, and P. B. Scott. Filed 10 Apr 79, 7p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A high energy XeBr laser for producing coherent radiation at 282 nm is disclosed. The XeBr laser utilizes an electric discharge as the excitation source to minimize formation of molecular ions thereby minimizing absorption of laser radiation by the active medium. Additionally, HBr, is used as the halogen donor which undergoes harpooning reactions with Xe/sub M/ to form XeBr. (ERA citation 05:029464)

PATENT-4 176 326
Not available NTIS
Department of Energy, Washington, DC.
CF Sub 4 Laser.
Patent,
C. Wittig, and J. J. Tiee. Filed 20 Oct 77, patented 27 Nov 79, 4p PAT-APPL-844 086
Suprsedes PAT-APPL-844 086-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A CF sub 4 laser is presented for producing near 16 mu m radiation utilizing a line tunable CO sub 2 laser as an optical pumping source. The device uses a cryogenically cooled optically pumped cell containing molecular CF sub 4 gas. An optical resonant cavity formed around the optically pumped cell induces oscillations of near 16 mu m radiation from the nu sub 2 + nu sub 4 implies nu sub 2 transition in the molecular CF sub 4 gas. 8 claims. (ERA citation 05:029469)

SAND-79-1323C PC **A03/MF A01**
Sandia Labs., Albuquerque, NM.
Saturated Energy Extraction and Beam Quality from Phoenix I, an Electron-Beam-Initiated H sub 2 -F sub 2 , HF Amplifier.
J. M. Hoffman, E. L. Patterson, G. C. Tisone, and J. B. Moreno. 1979, 32p CONF-791220-2
Contract EY-76-C-04-0789
International conference on lasers '79, Orlando, FL, USA, 17 Dec 1979.

Energy-extraction experiments are reported for the Phoenix I NH amplifier. The input beam was generated with a discharge-initiated oscillator-preamplifier system operating on mixtures of SF sub 6 -HI or SF sub 6 -C sub 2 H sub 6 and an electron-beam-initiated intermediate amplifier (lambda-3) fueled with H sub 2 and F sub 2 mixtures. When the oscillator-preamplifier system used mixtures of SF sub 6 -HI the input spectrum to the Phoenix I amplifier contained approx. 28 P-branch vibrational-rotational lines which were almost identical to the input spectrum from the H-F sub 2 fueled oscillator. The energy extraction results were essentially identical to earlier results that were obtained with the spectrum produced using H sub 2 and F sub 2 mixtures which contained about 30 P-branch lines. Energy extraction measurements made with the oscillator-preamplifier operating with SF sub 6 - C sub 2 H sub 6 mixtures with 20 lines gave results which were only 10% lower than the results obtained with SF sub 6 -HI. With the SF sub 6 -C sub 2 H sub 6 spectrum, extraction was only obtained from the first three excited vibrational levels indicating that most of the energy was contained in those three vibrational levels. Comparison of the results with a simple model and with a comprehensive HF code indicate that parasitic oscillations are important in determining the energy extraction characteristics of the amplifier. The amplified spontaneous emission was reduced by a factor of 2 to 3 as the input intensity was increased from 0 to 1 x 10 exp 6 W/cm exp 2 . Further increases in the input intensity did not further reduce the amplified spontaneous emission. The change in the beam quality during amplification was investigated using a lateral-shearing interferometer. These results demonstrated that saturating the amplifier did not distort the optical beam quality. (ERA citation 05:007509)

SLAC-PUB-2371 PC **A02/MF A01**
Stanford Linear Accelerator Center, CA.
Variable Parameter Free Electron Laser.
P. L. Morton. Aug 79, 14p CONF-790853-1
Contract EY-76-C-03-0515
ONR workshop on electron generators of coherent radiation, Telluride, CO, USA, 13 Aug 1979.

The recent successful operation of the free electron laser by the group at Stanford and the availability of high power electron beams has stimulated a great deal of interest in the use of the free electron laser (FEL) to produce a high power tunable laser beam. The paper treats the FEL in a manner which has been used by accelerator physicists to treat the acceleration of charged particles with radio frequency accelerating systems. This allows the ideas that have been developed for the acceleration of charged particles to be used in the design of the wiggler magnet used for the FEL. The emphasis of the paper is mainly tutorial so that the derivation of the equations are presented in a physically intuitive fashion rather than in a strictly rigorous manner. This type of treatment displays in a rather graphic way how the variation of the magnetic wiggler field and wave length affects the coupling of the electron energy to the optical laser beam. We will find that by proper variation of the wiggler parameters, it is possible to obtain a tremendous improvement in the performance of a variable parameter wiggler over the constant parameter wiggler. (ERA citation 04:055382)

20F. Optics

AD-A086 285/4 PC **A02/MF A01**
Eikonix Corp Burlington MA
Analytical Studies of Phase Estimation Techniques.
Interim rept. no. 3, 15 Jan-16 Aug 79,
Robert A. Gonsalves, and Robert H. Chidlaw.
Apr 80, 18p EC/2107401-TR-3, RADC-TR-80-100
Contract F30602-77-C-0176, ARPA Order-3223

Phase retrieval algorithms are presented for extended objects and for multiple images arising, for example, from observations at several wavelengths or several focal planes. The first experimental demonstration of phase retrieval is reported. (Author)

AD-A086 417/3 PC **A02/MF A01**
Stanford Univ CA Edward L Ginzton Lab
Multiple-Pass Raman Gain Cell,
W. R. Trutna, and R. L. Byer. 27 Apr 79, 13p GL-3047, AFOSR-TR-80-0433
Contract F49620-77-C-0092
Pub. in Applied Optics, v19 n2 p301-312, 15 Jan 80.

No abstract available.

AD-A086 419/9 PC **A04/MF A01**
Electronics Research Lab Adelaide (Australia)
The Spectral Characteristics of Metal Film Beam Splitters.
Technical rept.,
J. R. Venning. Jan 80, 57p Rept no. ERL-0123-TR

The spectral and polarisation characteristics of metallic beam splitters and mirrors made of single films of aluminum, silver, rhodium or nichrome on glass are described. Normal incidence transmission data of each thickness of metal film used in the beam splitter calculations is included for use when measuring or monitoring the deposition of the thin films. The presentation is mostly graphical and intended for the user and maker of simple metal beam splitters. (Author)

AD-A086 658/2 PC **A02/MF A01**
Center for Information and Numerical Data Analysis and Synthesis West Lafayette IN
Critically Evaluated Data on Optical and Transport Properties of Solids (Refractive Index and Absorption Coefficient of Selected Optical Materials).
Annual rept. 1 May 79-30 Apr 80,
H. H. Li. 3 Jun 80, 13p AFOSR-TR-80-0539
Contract F44620-76-C-0105

In this report, experimental material on the absorption coefficients of alkaline earth halides was searched, compiled, and analyzed. It was found that the bulk of available data was concentrated to the absorption edges of the main transparent region for the four materials calcium fluoride, strontium fluoride, barium fluoride, and magnesium fluoride. An equation was formulated to best describe the absorption data in the infrared multiphonon region as a function of both frequency and temperature. It was noted that the same type of equation is equally valid for both alkaline earth halides and alkali halides. Although the intrinsic absorption was predicted by the proposed equation, discrepancies might occur in the region where absorption is extremely low and where extrinsic absorptions due to impurities and surface contamination dominate the intrinsic absorption by factors ranging from fractions to multiples of ten. Experience has shown that extrinsic contributions can be reduced through improved crystal growing and surface polishing techniques. The work on the absorption coefficient of silicon and germanium was in progress. It was found that the absorption coefficient is sensitive to the amount and kind of impurities usually being introduced as desirable dopants. Numerous experimental material was made available. Currently the work remained in the stage of data extraction and compilation.

AD-A086 665/7 PC **A03/MF A01**
Honeywell Corporate Material Sciences Center Bloomington MN
Optical Interarray Processing.
Final rept. 1 Oct 79-31 Mar 80.
Mar 80, 41p
Contract N00014-80-C-0216

This project had two major objectives. The first objective was to demonstrate nonreal time generation of ambiguity functions from one dimensional input transducers. The second objective was to design front end and rear end electronics capable of supporting real time operation of the optical processor. Both of these objectives were successfully achieved, and in addition, a new optical architecture was invented (LIPS), and its feasibility and superiority was experimentally demonstrated. The optical system demonstrating the proposed Passive Optical Tau-Shift concept (POTS) was designed with a large f number (>20) for aberration-free performance, and the system length became 12 meters. One dimensional Bragg cell-sized photographic transparencies were used to generate ambiguity functions. The results of processing both analytic V-FM signals and synthetic data from NOSC showed excellent agreement with theoretical predictions in terms of the correlation peak height and resolution. Another optical architecture based on an entirely new concept of a space variant Linear Phase Shifter (LIPS) was independently developed. It generates a tau-shift by a shear operation instead of the rotation used in POTS.

AD-A086 706/9 PC **A04/MF A01**
ITT Electro-Optical Products Div Roanoke VA
Manufacturing Methods and Technology Program for Ruggedized Tactical Fiber Optic Cable.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 79,
R. J. Hoss, and R. Kopstein. 26 Jan 80, 65p ITT-80-03-07B, CORADCOM-79-0789-2
Contract DAAK80-79-C-0789

The scope of this quarter's effort, as reported herein, includes the following tasks and achievements: (1) Cable Process Optimization--(a) Complete first engineering samples; test, select optimized fiber buffering, (b) Complete lay length evaluation samples; test, select optimized lay length, (c) Receive polyurethane materials (four types, four manufacturers); (2) Use of Facilities--(a) High speed strander, set up and operational; achieve 50% of production rate, (b) Extruder set up and

operational, (c) Fiber optic measurement station design complete and partial fabrication.

AD-A086 747/3 PC **A02**/MF **A01**
Hughes Research Labs Malibu CA
Moisture Protective Coatings for Alkali Halide IR Optics,
Semi-annual rept. 1 Nov 79-30 Apr 80,
Frederick G. Yamagishi, and Leroy J. Miller. Jul 80, 23p
Contract MDA903-80-C-0096, ARPA Order-3833

The objective of this program is to develop plasma-polymerized films that are transparent, moisture-protective coatings to increase the lifetime and durability of press-forged KBr IR optical elements. Reaction conditions have been established that yield uniform films of plasma-polymerized ethane (PPE) on polished and etched single-crystal KBr flats. On polishing, polycrystalline KBr formed localized grains that could not be removed by chemical etching with HBr. Surface passivation could be achieved with a plasma of CF3Br or CF2C12. An air leak in the reactor caused extensive corrosion problems with CF3Br. Repairing the leak eliminated the corrosion problem. On a concurrent IR&D program, we are developing a new surface passivation method for NaCl using a non-IR-absorbing surfactant. PPE deposited on this treated surface afforded protection from damage by 98% relative humidity for 11 days. It is important to eliminate trapped free radicals in the film to reduce the chance of forming a more polar material caused by the reaction of the radicals with atmospheric oxygen. Treating the film briefly with a hydrogen plasma quenched the radicals, but the method was no more effective than the present method of storing under an ethylene atmosphere. The use of DEHA, a two hydrogen atom donor, is being studied in an IR&D program as a radical quencher and may be applied to this program if it proves successful.

AD-A086 816/6 PC **A05**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Alignment of Liquid Crystals by Surface Gratings.
Technical rept.,
David C. Shaver. 31 Oct 79, 76p ESD-TR-79-267
Contract F19628-80-C-0002, ARPA Order-3336

Square-wave grating structures with periodicities ranging from 3200 A to 12 micrometers were etched into fused quartz substrates, and the effect of such gratings on liquid crystal alignment was studied. Gratings with periodicities below 4 micrometers appear to be required to align typical room-temperature nematic liquid crystals. At larger periodicities a pronounced defect texture forms. The defect texture is created during nucleation and growth of the nematic phase as it cools from the isotropic phase. The defect texture is stabilized by adsorption of an oriented molecular layer on the substrate surfaces. This adsorbed layer exerts an orienting torque on the bulk liquid crystal. Experiments were performed to demonstrate the existence of such an adsorbed layer. The tilt angle of the nematic director from the plane of quartz substrates was measured for liquid crystals used in the alignment experiments. M24 and the 'heptyl/butyl mixture' align with the director in the substrate plane. MBBA aligns with a tils angle of about 23 deg on fused quartz, whether or not a grating structure is present. Surface gratings were also formed by patterning a 'monolayer' of DMOAP. Such patterned organic monolayers, which have no appreciable surface relief, are effective at aligning liquid crystals. This represents a new approach to liquid crystal alignment. High-quality alignment of the smectic A phase of M24 was induced by a 3200-A-period square-wave surface-relief grating. A novel twisted-nematic liquid crystal display which uses metal gratings for polarization of light as well as for liquid crystal alignment was fabricated.

AD-A086 874/5 PC **A04**/MF **A01**
ITT Electro-Optical Products Div Roanoke VA
Manufacturing Methods and Technology Program for Ruggedized Tactical Fiber Optic Cable.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 80,
R. J. Hoss, and R. Kopstein. 26 Apr 80, 71p ITT-80-17-04B, CORADCOM-79-0789-3
Contract DAAK80-79-C-0789

The scope of this quarter's effort, as reported herein, includes the following tasks and achievements: (1) Cable Process Optimization; (a) Complete polyurethane jacket evaluation samples (four types, four manufacturers), (b) Complete fungus testing, (c) Select optimized polyurethane type, (d) Begin optimized cable fabrication for third engineering sample, (e) Deliver second engineering sample and test report (lay length and polyurethane evaluation samples); (2) Use of Facilities; (a) Achieve 75% of production rate on the high speed strander, (b) Install new Kevlar serving line, start setting up, and make operational, (c) complete extruder set up and work toward 0.8 h/km rate, (d) Set up and make spooler operational, achieve 50% production rate, (e) Assemble test stations and characterize; and (3) Secondary Performance Milestones; (a) Achieve 0.5 dB/km induced attenuation from cabling operation.

PAT-APPL-6-031 809 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Optical Device.
Patent Application,
B. S. Brunsden. Filed 20 Apr 79, 36p
Contract AT(11-1)-69
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A device is presented for radially translating radiation in which a right circular cylinder is provided at each end thereof with conical prism faces. The faces are oppositely extending and the device may be severed in the middle and separated to allow access to the central part of the beam. Radiation entering the input end of the device is radially translated such that radiation entering the input end at the perimater is concentrated toward the output end at the perimater is concentrated toward the output end at the perimater is concentrated toward the output central axis and radiation at the input central axis is dispersed toward the output perimeter. Devices are disclosed for compressing beam energy to enhance drilling techniques, for beam manipulation of optical spatial frequencies in the Fourier plane and for simplification of dark field and color contrast microscopy. Both refracting and reflecting devices are disclosed. (ERA citation 05:029424)

PAT-APPL-6-037 982 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Laser Beam Alignment Apparatus and Method.
Patent Application,
C. R. Gruhn, and R. B. Hammond. Filed 10 May 79, 9p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The disclosure related to an apparatus and method for laser beam alignment. Thermoelectric properties of a disc in a laser beam path are used to provide an indication of beam alignment and/or automatic laser alignment. (ERA citation 05:029466)

PATENT-4 169 280
Not available NTIS
Department of Energy, Washington, DC.
Method for Making Glass Nonfogging.
Patent,
D. E. Lord, G. W. Carter, and R. R. Petrini. Filed 13 Jul 78, patented 25 Sep 79, 4p PAT-APPL-924 337
Supersedes PAT-APPL-924 337-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method is presented for rendering glass nonfogging (to condensation for) by sandwiching the glass between two electrodes such that the glass functions as the dielectric of a capacitor, a large alternating current (ac) voltage is applied across the electrodes for a selected time period causing the glass to absorb a charge, and the electrodes are removed. The glass absorbs a charge from the electrodes rendering it nonfogging. The glass surface is undamaged by application of the ac voltage, and normal optical properties are unaffected. This method can be applied to optical surfaces such as lenses, auto windshields, mirrors, etc., wherever condensation fog on glass is a problem. 3 claims. (ERA citation 05:029421)

PB80-202914 PC **A12**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Basic Optical Properties of Materials: Summaries of Papers,
Albert Feldman. May 80, 256p NBS-SP-574
Sponsored in part by Optical Society of America, Washington, DC. Presented at the Topical Conference on Basic Optical Properties of Materials Held at Gaithersburg, Maryland, May 5-7, 1980. Library of Congress catalog card no. 80-600038.

This Special Publication contains summaries of papers presented at the Topical Conference on Basic Optical Properties of Materials on May 5-7, 1980. This publication contains summaries of 62 papers which include 14 invited papers. The principal topical areas are: Nonlinear Optical Properties; Ultraviolet Properties; Infrared Properties; Graded Index Materials; Inhomogeneous Materials; Properties of Thin Films; Optical Fibers, Planar Optical Waveguides; External Influences - Piezo-optics, Thermo-optics, Magneto-optics. The purpose of the conference is to discuss the state of the art in the measurement of the optical properties of optical materials. The emphasis is primarily on materials properties rather than on optical devices. The primary focus of the conference is on the measurement and theory of basic optical properties of materials in bulk, thin film and fiber form.

PB80-203920 PC **A03**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
Stress in Porous Thin Films Through Adsorption of Polar Molecules.
Technical rept.,
E. H. Hirsch. Mar 80, 30p ERL-0124-TR, AR-001-952

Films of magnesium fluoride are found to be under large tensile stress following exposure to water vapour. It is shown that this stress, which varies reversibly in magnitude with the adsorption equilibrium, can be attributed to electrostatic dipole interaction between the adsorbed water molecules. The effect is not confined to magnesium fluoride, but can occur in other materials of an appropriate porous structure. Its relevance to the stability of optical coatings is discussed, together with some other applications.

SAND-79-1208 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Electron-Beam Induced Absorption and Hardening in Fiber-Optic Waveguides to 1060 nm Laser Pulses.
M. J. Landry, and H. P. Davis. Jul 79, 26p
Contract EY-76-C-04-0789

The coupling efficiencies (output/input energy) before and after electron-beam irradiation, the output energy density, the induced attenuation or loss (L/sub I/) and its decrease as a function of time, and hardening as a function of number of Febetron shots (N/sub F/) were determined for fiber-optic waveguides (FOWs). The FOWs were electron-beam irradiated with 8.3 to 12.3 J/cm exp 2 for 2.36 to 2.84 x 10 exp 6 R (exp 60 Co equivalent) dose. The output laser energy density varied from 0.19 to 2.12 kJ/cm exp 2 which was about 50 percent of the input surface threshold damage level previously measured in similar FOWs. The induced attenuation (L/sub I/) as a function of recovery time (t) (after electron-beam irradiation) was linear on log-log plot for a short time (< 2.2 x 10 exp -4 s), changing from 1.8 to 0.2 in slightly larger than one order of magnitude change in t. The rate of recovery decreased with increasing time so that the total change in L/sub I/ was about 3 orders of magnitude in 6 orders of magnitude change in time. A slight hardening occurred in fibers with increasing number of Febetron shots. (ERA citation 05:003393)

SAND-79-1318C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Phoenix I: a Transverse Electron-Beam-Initiated HF Laser Amplifer.
S. L. Patterson. 1979, 20p CONF-791220-1

Contract EY-76-C-04-0789
International conference on lasers '79, Orlando, FL, USA, 17 Dec 1979.

The Phoenix I hf amplifier is operated with gas mixtures of F sub 2 , O sub 2 , and H sub 2 at total pressures in excess of 4.5 atm. The H sub 2 -F sub 2 chemical reaction is initiated with a 1.5-MeV 85-kA electron beam, which has a cross-sectional area of 7.5 cm x 44 cm and which propagates transversely to the amplifier optical axis. For an electron-beam deposition density of 17 J/l-atm a chemical efficiency up to 3.6% or an intrinsic electrical efficiency up to 324% was obtained. The peak chemical efficiency and peak electrical efficiency were obtained with different gas mixtures. (ERA citation 05:008986)

20G. Particle Accelerators

AD-A086 493/4 PC **A03**/MF **A01**
Spire Corp Bedford MA
Collective Ion Acceleration and Electron Beam Propagation in Dielectric Guides.
Annual rept. 1 Feb 79-31 Jan 80,
Ward Halverson, and Anton C. Greenwald. 1 Apr 80, 41p AR-10067-01, AFOSR-TR-80-0463
Contract F49620-79-C-0046

Measurements of front velocity and transported electron beam current are reported for several configurations of dielectric guide. It appears that the ions which determine the speed of beam-front propagation come only from a short section of dielectric near the inlet of the guide. They are accelerated in the potential well of the virtual cathode formed when the space-charge-limited electron beam is injected. Plasma formed by electron bombardment of the downstream guide walls apparently does not influence the beam-front speed, although it is important in determining the efficiency of current transport. Measurements of collective ion acceleration have been deferred until the second year of the program. (Author)

BNL-27654 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Optimization of a Synchrotron Radiation Source.
A. van Steenbergen. 1979, 18p CONF-791176-2
Contract EY-76-C-02-0016
Japan-USA seminar on synchrotron radiation facilities, Honolulu, HI, USA, 5 Nov 1979.

Some aspects of the optimization of an electron storage ring as a synchrotron radiation source will be presented. This will include the choice of magnet ring structure, choice of electron accelerating system parameters and choice of structure sections for the use of high field wigglers or undulators. (ERA citation 05:024556)

BNL-27678 PC **A10**/MF **A01**
Brookhaven National Lab., Upton, NY.
Characteristics of Synchrotron Radiation and of Its Sources.
S. Krinsky, M. L. Perlman, and R. E. Watson.
1979, 206p
Contract EY-76-C-02-0016

Synchrotron light emission and the classical relativistic electromagnetic theory describing it are reviewed. The electron optics of storage rings are considered in some detail, beginning with the ideal electron orbit and the distribution which electrons take around it. This is folded with the process of synchrotron light emission itself to define the effective photon source. The predictions of classical relativistic theory are compared with experiment, and one finds agreement within the experimental uncertainties. Further refinements, such as wiggler magnets and free electron lasers are also considered. (ERA citation 05:024557)

DESY-79-08 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
DORIS At 5 GeV. The DORIS Storage Ring Group.
W. Bothe, D. Degele, H. C. Dehne, H. Febel, and H. Gerke. 1979, 37p
U.S. Sales Only.

The storge ring DORIS at DESY is described. The new vertical bending section, the linear beam optics, the numerical correction of the saturation effects, the chromaticity correction, the estimation of the energy error, the RF-system for single-ring operation, the vacuum system, the power supply and the cooling system, the generation and injection of single bunches, the observed single beam instabilities, the damping of coherent transverse instabilities by a feedback system, the beam-beam interaction, the dispersion in the cavities and its consquences, the luminosity monitor, and the operating experience are considered. (Atomindex citation 10:470375)

DL/NSF/TM-40 PC **A02**/MF **A01**
Science Research Council, Daresbury (England). Daresbury Lab.
Design, Manufacture and Testing of the Hydrostatic Bearing for the NSF 90 exp 0 Analysing Magnet.
W. J. Acton, and D. B. Myers. Oct 78, 23p
U.S. Sales Only.

This report describes the design, manufacture and testing of the hydrostatic bearing which will be used to support the 90 exp 0 analysing magnet of the 30 MV tandem electrostatic accelerator now being constructed at Daresbury Lboratory. (Atomindex citation 10:430510)

DL/NUC/TM-42A PC **A03**/MF **A01**
Science Research Council, Daresbury (England). Daresbury Lab.
Pressure Vessel for the NSF Tandem.
C. W. Jones. Apr 79, 45p
U.S. Sales Only.

The pressure vessel is a major component of the 30 MV tandem Van de Graaff electrostatic accelerator to be used in nuclear structure research at Daresbury Laboratory. The accelerator will be capable of accelerating the full range of ions in the form of a beam. Acceleration takes place in a vertical evacuated tube (beam tube) by means of a high potential on a terminal at the central position, the terminal and beam tube assembly being supported by an insulated stack structure within the pressure vessel. Under operating conditions the vessel is filled with sulphur hexafluoride gas (SF sub 6) at high pressure which acts as an insulating medium between the centre terminal and the vessel wall. The vessel is situated inside a concrete tower which besides supporting the injector room above the vessel also acts as radiation shielding around the accelerator. The report covers: functional requirements; fundamental considerations with regard to the design and procurement; detail design; materials; manufacture; acceptance test; surface treatment; final leak test. (Atomindex citation 10:470390)

FRNC-TH-842 PC **A06**/MF **A01**
Paris-11 Univ., Orsay (France).
Study and Design of a Function Generator.
D. Bogard. 102p
In French.These (3e Cycle).
U.S. Sales Only.

The aim of this study is to design the function generators that will make it possible to obtain the n and n' analog voltages for controlling the auxiliary power supplies of the quadripoles of Saturne II (pulsed magnetic field synchrotron). These analog voltages are of shape: u=f sub 1 (B) + f sub 2 (t). These generators will be integrated in the data processing facility associated with the power supplies of the quadripoles The generators will therefore be piloted by the central computer of Saturne I. As this computer will be monitoring all the equipments of Saturne, it must not be immobilised by the generators in any event. (Atomindex citation 11:502791)

INP-868/PL MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Quasi-Isochronous Conditions of Ion Acceleration on the U-120 Cyclotron in Cracow.
J. Schwabe, and J. Starzewski. 1975, 13p
In Polish.
U.S. Sales Only. Microfiche copies only.

The beam phase conditions making possible quasi-isochronous acceleration on the U-120 cyclotron in Cracow are discussed. The quasi-isochronous acceleration significantly improves the beam parameters (energy scattering, emittance), increases the variety of accelerated ions and also ensures an increase in the maximum accelerated ion beam energy. (Atomindex citation 10:455730)

INS-TL-134 PC **A04**/MF **A01**
Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study.
Practical Method for Target Preparation of Powdered Materials.
I. Sugai. 5 Dec 77, 60p
U.S. Sales Only.

This is the sixth report on the practical method of target preparation for use in nuclear physics experiments following the previous one (INS-TL-131, 1976). We have made various targets by developing the centrifugal precipitation method, which is particularly effective in the cases; (a) metal with high melting point and low vapor pressure, (b) oxides which are difficult to prepare by the usual vacuum evaporation technique and (c) some enriched isotopes which are very minute in quantity (less than - 10 mg) and low in recovery ratio. The samples were once suspended in liquid paraffin by ultrasonic wave vibrator, and then centrifugally precipitated on a thin backing foil such as Mylar or aluminum set and the bottom of the centrifugal tube. Uniformity of target made in this way was checked by an exp 241 Am- alpha ray thickness gauge. Contaminations smudged in the preparing process were checked by irradiating the targets with the proton beam from the FM Cyclotron at I.N.S. (Atomindex citation 09:410576)

ITEF-125(1977) PC **A04**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Experience of Precision Measuring Distances by Invar Wires at Accelerators.
N. I. Porubai. 1977, 51p
In Russian.
U.S. Sales Only.

With a view to determining the deformations and displacements of the ring foundation of the ITEP accelerator, the method of very accurate distance measurements by means of invar wires and strips is described. Measurement errors are analyzed. This method has allowed to measure distances up to 40 m with a mean-square error of less than 40 mu m. The calibration accuracy of 3 and 25-m measuring wires has been determined to be +- 27 mu m. Time instability of the wires is +- 16 mu m. It is shown that strips are more stable in time than wires. Elongation of 6, 19, 25 and 38 m invar wires has been measured as function of the tension time. The error due to tension of a 38-m wire may be tangible. Data on thermal coefficient variation in time has been obtained for invar wires and strips. The multiannual measurements of the ring foundation deformations show that variations of the mean radius are caused by increases of concrete temperature. Temperature increase by only 1 deg caused mean radius increase of 0.3 mm. (Atomindex citation 10:430540)

JAERI-M-7581 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Linac Neutron Spectrometer.
H. Motohashi, and M. Sakamoto. Mar 78, 31p
In Japanese.
U.S. Sales Only.

A time-of-flight spectrometer for neutron diffraction study in solids and liquids has been constructed, which uses pulsed neutrons produced by the JAERI electron linac. This report describes its layout and performance. Using a heterogeneously poisoned moderator with cadmium sheets, the time resolution is delta t/t = 0.005 in measurement of diffraction profile of LiF single crystal, and usable wavelength of neutrons is from 0.4 to 4A in diffraction pattern of Ni polycrystal. (Atomindex citation 10:430536)

JINR-R-9-11863 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.

Formation of the Magnetic Field of the Accelerating Magnetic System for the Heavy Ion Collective Accelerator Prototype.
V. S. Aleksandrov, Yu. I. Aleksakhin, V. M. Lachinov, V. K. Makoveev, and E. .A. Perel'shtein. 1978, 20p
In Russian.
U.S. Sales Only.

The results of the pulse magnetic field formation of the accelerating magnetic system for the heavy ion collective accelerator prototype are presented. Magnetic field distribution in the acceleration region is measured. The relative gradient is close to the calculated one and equals 4.5x10 exp -3 sm exp -1 . The investigation of the dependence of magnetic field distribution in the roll-out region on the magnetic system parameters and simulation of the electron-ion ring roll-out allowed to find a regime in which gradients do not exceed the calculated maximum permissible values. Azimuthal inhomogeneity and the influence of accelerator construction elements are estimated. Particularities of the magnetic field median plane distortions caused by the solenoid are determined and correcting solenoid parameters are chosen. A set up for the formation and measurement of magnetic field and the measurement techniques are described. (Atomindex citation 10:430511)

JINR-R-9-11672 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Computation of the Injection Channel of High Current Beam for the Meson Factory of the Institute of the Nuclear Research of the Academy of Sciences of the USSR.
G. N. Vyalov, N. Yu. Kazarinov, E. A. Perel'shtein, V. D. Rukavishnikov, and V. F. Shevtsov. 1978, 15p
In Russian.
U.S. Sales Only.

The injection channel region of high-current beam from injector up to buncher has been computed. The beam dynamics is considered by the momentum procedure as well as by effective linearizing of space charge forces. The channel dimensions optimization under the "Man-Machine" dialog routine and optimization by the FUMILI program has been done. The effects stipulated by space charge nonlinearity are considered for selected variant in the super-macro particle model. The chosen dimensions of the channel elements provide beam transport with different distributions without losses. (Atomindex citation 10:470422)

JINR-R-9-11704 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Measurement of the Magnetic Field of the Electron Cyclotron on-Line with the ES-1010 Computer.
V. N. Anosov, P. T. Shishlyannikov, and Z. N. Shishlyannikova. 1978, 8p
In Russian.
U.S. Sales Only.

The automatic measuring system on-line with the ES-1010 computer for the electron cyclotron magnetic field is described. The magnetometer sygnal has been measured with the help of the digital voltmeter connected with the ES-1010 interface. The field measurement rate, including the data processing is about 10 min per one azimuthal scan. The measurement accuracy was found to be about 5x10 exp -4 . (Atomindex citation 10:430514)

JINR-R-9-11776 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Formation of Electron Rings in Static and Pulsed Magnetic Fields.
L. S. Barabash, P. F. Beloshitskii, N. Yu. Kazarinov, E. A. Perel'shtein, and V. P. Sarantsev. 1978, 19p
In Russian.
U.S. Sales Only.

With the aim of increasing cycle of operation of the ion collective accelerator a compressor for electron rings with a static magnetic field is considered. For ring moving into the region of a strong static field a pulse magnetic field in the form of a travelling wave is used. The travelling wave is created by a current pulse travelling over the distributed parameters line. The conditions for electron rotational energy gain and their focusing are provided. The simulation results of electron ring dynamics are presented and some technical advantages of compressor are discussed. (Atomindex citation 10:470369)

JINR-R-9-11916 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
RMS-Dimensions of Circular Charged Particle BEAMS.
N. Yu. Kazarinov, and E. A. Perel'shtein. 1978, 12p
In Russian.
U.S. Sales Only.

The system of equations for rms dimensions of circular charged particle beams has been obtained using the momentum method. The betatron oscillations and energy spread have been taken into account. The steady state of beams and their stability are considered. For slowly changing external electromagnetic fields adiabatic invariants are found. These invariants may be used for determination of beam rms dimensions at an arbitrary moment of time. (Atomindex citation 10:470391)

JINR-R-9-11949 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Separation of Electron Ion Ring Components (Computational Simulation and Experimental Results).
V. S. Aleksandrov, G. V. Dolbilov, N. Yu. Kazarinov, V. I. Mironov, and V. G. Novikov. 1978, 18p
In Russian.
U.S. Sales Only.

The problems of the available polarization value of electron-ion rings in the regime of acceleration and separation of its components at the final stage of acceleration are studied. The results of computational simulation by use of the macroparticle method and experiments on the ring acceleration and separation are given. The comparison of calculation results with experiment is presented. (Atomindex citation 10:470366)

JINR-10-9968 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Data Processing and Visual System for Heavy Ion Accelerator Automatic Control System.
A. Kh. Angelov, V. D. Inkin, and V. N. Lysyakov. 1976, 7p
In Russian.
U.S. Sales Only.

The principles and the concrete ways of development of the automatic control system (ACS) of a heavy ion accelerator are considered. The ACS second turn is aimed at providing the optimum operator- and system interaction. The system consists of the TPA/i type computer with a wide set of external devices, including a grid display for the visual information output, an alphabit-digital display, a memory display, a teletype, a dataplotter and an indicating-storage terminal. (Atomindex citation 10:430513)

JINR-13-11852 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
System for Adjustment and Control of Particle Beam Parameters on the Basis of the ES-1010 Computer.
Yu. M. Damatov, A. D. Kirillov, and L. N. Komolov. 1978, 8p
In Russian.
U.S. Sales Only.

The system for adjustment and control of particle beam parameters based on the ES-1010 computer is described. The system provides the measurement and control of magnet element currents and beam intensity. Particle coordinates are determined by using three pairs (X, Y) of proportional chambers. The detection electronics is made in CAMAC standard. The use of specially developed units such as for single track event selection and for coding information from chambers permits an increase of an order of magnitude in the statistics acquisition rate as compared to traditional hodoscope system. The software for data acquisition and processing is described. Possibilities of the system in the adjustment of the channel for biological research have been investigated. (Atomindex citation 10:470378)

KEK-77-21 PC **A03**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Beam Intensity Monitor for KEK Proton Synchrotron.
S. Hiramatsu, K. Muto, and S. Shibata. Feb 78, 26p
In Japanese.
U.S. Sales Only.

Beam current monitor systems of KEK proton synchrotron were constructed using "current transformers". Large RF noise observed in the signal was completely rejected by RF shield and RF rejection filter which was carefully designed in its frequency response. Stability and frequency response were greatly improved using a feedback amplifier of current transformer which was designed based on a quantitative analysis of the feedback loop. (Atomindex citation 10:430529)

KEK-77-27 PC **A02**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Electrostatic Separator and Mass Separation.
A. Yamamoto, H. Ishii, S. Kurokawa, H. Hirabayashi, and K. Hayashi. Mar 78, 20p
U.S. Sales Only.

Present performance of KEK electrostatic separator (Mark I) and the results of mass separation test using this separator and described. Maximum voltage of 900 kV was obtained with the 3 m separator and of 800 kV with the 9 m separator across the electrode spacing of 10 cm. Mass separation test using the 9 m separator was attempted at the bubble chamber beam KI, and mass separation between pion and proton was achieved at the momentum of 3.5 GeV/c and 2 GeV/c. Separation ratio of -- 3.6 between pion and proton was obtained. The relative kaon yields were enriched from -- 1/200 to -- 1/15 at the mass slit when the separator was tuned at the momentum of 3.5 GeV/c. (Atomindex citation 10:455741)

KEK-77-30 PC **A05**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Magnetic Field Measurements of the Booster Synchrotron Magnet.
M. Kumada, H. Sasaki, K. Takikawa, H. Someya, and T. Kurosawa. Mar 78, 79p
U.S. Sales Only.

The magnetic field properties of the booster synchrotron magnet are investigated. Method of the field measurement, magnetic field measuring system, its data acquisition system and procedure of data processing are described in detail, with a special emphasis on the accuracy in the measurement. The excitation dependences and distributions of the field strength, field gradient, multipole fields and their effective lengths are given and analyzed. The betatron tune and chromaticity are discussed by taking account of the effect of the fringing field as well as the multipole fields of focussing and defocussing sectors. (Atomindex citation 10:455718)

KEK-77-31 PC **A06**/MF **A01**
Shielding Calculation of Slow Extracted Beam Facility at KEK Proton Synchrotron.
H. Hirabayashi, K. Katoh, K. Katoh, and H. Hirayama. Mar 78, CONF-7711122-
Symposium on shielding design of accelerator, Oho, Ibaraki, Japan, 7 Nov 1977.
U.S. Sales Only.

The KEK proton synchrotron has two external beam lines, viz. a fast extracted beam line for a bubble chamber and a slow extracted beam line for counter experiments. The maximum total intensity of the slow beam is estimated as 5 x 10 exp 12 protons per sec. For beam losses along the line, shielding calculation was made, and on the basis of these results, adequacy of the current shielding

construction plans was discussed. (Atomindex citation 10:445623)

LA-8356-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Investigation of a Large Solid Angle Pion Channel for a Medical Application Utilizing Current Sheets and Solenoid Elements.
T. Sugimitsu, and D. A. Swenson. May 80, 18p
Contract W-7405-ENG-36

For the treatment of tumors with pi-minus mesons (pions), a pion channel with a large solid angle is essential. A parallel beam of uniform density and reasonable size at the patient position is favored from the practical point of view. A new pion channel with sixty toroidal current sheets and some solenoids is shown to meet these requirements. It would also be useful for some physics experiments using low-energy pion and muon beam. (ERA citation 05:024554)

PUB-5031 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
ion Induction Linac 500 Joule Test Bed.
Sep 79, 49p
Contract W-7405-ENG-48

This proposal presents the design of the Test Bed and the engineering development on crucial components, and describes the experimental and theoretical program that will answer uncertainties regarding beam behavior. The 160 meter-long Test Bed will accelerate Cs exp +1 at a beam charge of 20 micro-coulombs. The ions will originate from a large contact ionization source and transit through two drift tubes before injection into the approximately 80 induction modules of the linac. The output energy will be 25 MeV. The Test Bed will be located on a long pad behind an existing building on the LBL site. Depending on the funding schedule, the project could span from 30 to 44 months, as described in the Cost and Schedule section. (ERA citation 05:004847)

SLAC-PUB-2392 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Particle Acceleration with TE sub 011 Cavity.
Z. D. Farkas. Sep 79, 4p CONF-790927-25
Contract EY-76-C-03-0515
Linear accelerator conference, Montauk, NY, USA, 10 Sep 1979.

Presently, the maximum effective electric field, E/sub a/, in an accelerating structure is limited by the available peak rf power. If the structure is superconducting, the peak power requirements are reduced by several orders of magnitude but E/sub a/ is limited by electron loading caused by surface electric fields. A right circular cylinder TE sub 011 cavity has no surface electric fields and therefore, E/sub a/ is not limited by electron loading but can reach a much higher value which is limited by magnetic breakdown. A particle traversing the cavity along a chord of a cylinder wall circle gains a net voltage. This paper calculates the shunt resistance of a TE sub 011 structure. It concludes that for the same E/sub a/, a 4.2 exp 0 K TE sub 011 structure at 500 MHz requires 1000 times less peak power and four times less average power than a nonsuperconducting TM sub 010 structure, and can sustain an E/sub a/ several times greater than can be presently sustained by a superconducting TM sub 010 structure. Acceleration by a TE sub 111 right circular cavity is also considered. (ERA citation 05:001684)

SLAC-PUB-2393 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
New Method for Positron Production at SLAC.
B. Aune, and R. H. Miller. Sep 79, 4p CONF-790927-23
Contract EY-76-C-03-0515
Linear accelerator conference, Montauk, NY, USA, 10 Sep 1979.

The focusing system for the positron beam at SLAC makes use of an adiabatically tapered solenoid whose transverse acceptance remains high over a broad energy band. From the computed distribution in energy of the accepted positrons, one can estimate that approximately one-half of the total number of positrons lies within the energy band from 2 - 4 MeV. Due to the debunching effect over the drift space following the target, only the high energy part (from 4.5 MeV to 10 MeV or more) of the accepted spectrum contributes to the useful current (within 1% energy bin). By decelerating the beam in a special short section very near the converter it is possible to obtain a bunching of all the accepted positrons with energy above 2 MeV within approximately 5 exp 0 , giving an improvement of a factor of two on the analyzed current. (ERA citation 05:001676)

SLAC-PUB-2405 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Results from the Mark II Detector at SPEAR: SLAC-LBL Collaboration.
V. Lueth. Sep 79, 13p CONF-790885-7
Contracts EY-76-C-03-0515, W-7405-ENG-48
International symposium on lepton and photon interactions at high energy, Batavia, IL, USA, 23 Aug 1979.

Recent results from the Mark II include measurements of the rho +- nu decay of the tau +- lepton, two-photon production of the eta'(958) meson, charmed meson decays, and the first observation of charmed baryons in e exp + e exp - annihilation. 19 figures, 4 tables. (ERA citation 05:006126)

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AD-A086 538/6 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Report by the Japan High Energy Physics Delegation to China, March 1979 (Selected Pages).
4 Jun 80, 34p Rept no. FTD-ID(RS)T-0274-80
Edited trans. of Enclosure to IR 1 511 0139 79 (China) p1-2, 47-77, 78.

No abstract available.

AED-Conf-77-524-002 PC **A02**/MF **A01**
Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.).
Experiments with Heavy Ions at UNILAC.
P. Armbruster. 1977, 20p CONF-7709154-1
In German.41. physicists' meeting, Karlsruhe, F.R. Germany, 20 Sep 1977.
U.S. Sales Only.

Some aspects of the application of the UNILAC for nuclear and atomic physics are given: Coulomb interactions between nuclei forming nuclear molecules, heaviest nucleon systems, U-U-reactions, superheavy elements and high spin states. (Atomindex citation 09:385291)

BARC-1012 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Annual Report of the Nuclear Physics Division (For the) Period Ending December 31, 1977.
C. L. Thaper, N. N. Ajtanand, and S. S. Kerekatte. 1979, 120p
U.S. Sales Only. Microfiche copies only.

The research and development activities of the Nuclear Physics Division of the Bhabha Atomic Research Centre, Bombay, during the calendar year 1977 are reported. The Division is organised into three research sections, namely, solid state physics section, fission physics section and Van de Graaff Laboratory. Techniques of neutron scattering, light scattering, Compton scattering and Moessbauer spectroscopy are used in the studies of solid state physics by the Solid State Physics section. In the Fission Physics Section, experimental studies are concentrated on fission phenomena accompanied by light charged particle emission, and theoretical investigations deal with various aspects of the fission process, heavy ion reactions and other related areas of nuclear reactions. Research activities of the Van de Graaff Laboratory include: (1) experimental studies of (p,n), (alpha ,n) and (alpha , alpha) nuclear reactions; (2) theoretical studies of nuclear structure, pion reactions, (p,2p) and other knock-out phenomena, ion-ion potentials and heavy ion collisions and (3) use of ion beam techniques for production of surface alloys and blistering by helium ion bombardment. Progress in the fabrication of DUMAS mass separator and tandem accelerator is reported. A 100 keV ion implantation facility has been set up and commissioned. (Atomindex citation 11:501560)

BARC-936 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Statistical Model Calculation of Fission Isomer Excitation Functions in (N,N') and (N, gamma) Reactions.
A. Chatterjee, A. L. Athougies, and M. K. Mehta. 1977, 23p
U.S. Sales Only.

A statistical model developed by Britt and others (1971, 1973) to analyze isomer excitation functions in spallation-type reactions like (alpha ,2n) has been adopted in fission isomer calculations for (n,n') and (n, gamma) reactions. Calculations done for exp 235 U(n,n')/sup 235m/U and exp 235 U(n, gamma)/sup 236m/U reactions have been compared with experimental measurements. A listing of the computer program ISOMER using FORTRAN IV to calculate the isomer-to-prompt ratios is given. (Atomindex citation 10:443631)

CEA-CONF-3990 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Experimental Survey of the Resonant Like Structures Observed.
J. Gastebois. 1977, 17p CONF-7705151-3
Conference on resonances in heavy ion reactions, Hvar, Yugoslavia, 30 May 1977.
U.S. Sales Only.

The important structures observed over a wide range of incident energies below and above the Coulomb barrier of the exp 16 O+ exp 12 C ingoing channel are surveyed for many outgoing channels such as elastic and inelastic scattering, outgoing alpha-particle or proton channels, and fusion. The excitation functions and cross section angular distributions make a number of 'anomalies' appear. Tentative explanations for some of them as resonances with a given spin, fitted by adding a resonating term to a given partial wave, are given. The lack of a systematic behavior throughout the whole set of observed structures makes it difficult to find a unified theory. (Atomindex citation 09:410383)

CNRS-CPT-77-P-912 PC **A04**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Flavoring of the Pomeron.
J. W. Dash, S. T. Jones, and E. K. Manesis. Mar 77, 60p
U.S. Sales Only.

A theoretical review and a detailed phenomenological description of the 'flavoring' of the bare Pomeron pole at t=0 (i.e. the non-diffractive renormalization of its multiperipheral unitarity sum by strange quarks, charmed quarks, diquarks,...) are presented. From an 'unflavored' intercept alpha =0.85 to a 'flavored' intercept alpha approximately 1.08, probably close to the bare intercept of the Reggeon Field Theory. NN, pi N, and KN total cross sections and real to imaginary amplitude ratios are treated. No oscillations are observed. Particular attention is paid to 2 sigmasub(KN) - sigmasub(pi N) which rises monotonically. A closely related combination of inelastic diffraction cross sections is presented which decreases monotonically, indicating that vacuum amplitudes are not simply the sum of a Pomeron pole and an ideally mixed f. In fact it is argued that a Pomeron +f structure is neither compatible with flavoring nor with schemes in which flavoring is somehow absorbed away. In contrast, flavoring is required for consistency with experiment by the Chew-Rosenzweig hypothesis of the Pomeron-f identity. A description of flavoring threshold effects on the Reggeon Field Theory at current energies is presented. (Atomindex citation 09:412333)

CNRS-CPT-77-PE-942 PC **A03**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Infrared Structure and Large Psub(T) Behavior of Quantum Chromodynamics.
E. de Rafael. Sep 77, 26p CONF-770786-1
France-Japan joint seminar on new particles and weak neutral currents, Tokyo, Japan, 14 Jul 1977.

U.S. Sales Only.

The study of the infrared structure of QCD in perturbation theory is an interesting problem per se regardless of its relationship to the confinement problem. The ultimate motivation for the study of the large transverse momentum behavior of QCD is to provide a field theoretic framework to the large Psub(T)-phenomena in hadronic interactions. As a first step towards that aim it is of interest to explore the possibility that the QCD Green's functions in 'some' regions of exceptional momenta, like the large-Psub(T) regime, may still obey some kind of renormalization group type equations. (Atomindex citation 10:471289)

CNRS-CPT-78-P-1010 PC **A03**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Studies on the C*-Algebraic Formulation of the Interaction of the Electromagnetic Field with the Matter.
W. A. Majewski. 1978, 26p
U.S. Sales Only.

In recent years C*-algebra concepts have been suggested for dealing rigorously with mathematical difficulties of Quantum Field Theory. To demonstrate some of the possibilities of these concepts sketch is presented for the description of the interaction of the electromagnetic field with the matter. In particular the asymptotic of the perturbed state of the field, explicit form of such state and notion of coherence on the Weyl system are studied. (Atomindex citation 10:471265)

CNRS-CPT-78-P-1021 PC **A04**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Spectral Function Sum Rules in Quantum Chromodynamics. I. Charged Currents Sector.
E. G. Floratos, S. Narison, and E. de Rafael. Jul 78, 55p
U.S. Sales Only.

The Weinberg sum rules of the algebra of currents are reconsidered in the light of quantum chromodynamics (QCD). The authors derive new finite energy sum rules which replace the old Weinberg sum rules. The new sum rules are convergent and the rate of convergence is explicitly calculated in perturbative QCDin the one loop approximation. Phenomenological applications of these sum rules in the charged current sector are also discussed. (Atomindex citation 11:504032)

CNRS-CPT-78-P-1026 PC **A02**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Two-Component Duality. A New Appraisal.
J. W. Dash, and Alex Martin. Jun 78, 13p
U.S. Sales Only.

The authors show that modern Regge fits to rising cross sections using the Harari-Freund p+f model of diffraction are not consistent with two component duality. If a conventional Pomeron is chosen (dominant j-plane pole plus weak cuts), the resulting f is dual to the resonances plus one-half the background. In contrast, the p - f identity model of diffraction is shown to satisfy a modified form of two component duality. (Atomindex citation 11:504019)

CNRS-CPT-78-P-1056 PC **A02**/MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Classical Motions in Yang-Mills Fields.
C. Duval. Dec 78, 8p
In French.
U.S. Sales Only.

The authors describe the motion of spinning test particles endowed with an internal structure. Geometrical notions associated to the espoused points of view are respectively the principle of general covariance and the hamiltonian formalism. (Atomindex citation 11:504027)

COO-3244-72 PC **A06**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Physics.
Pion Absorption Processes.
K. G. R. Doss. Apr 80, 112p
Contract AC02-76ER03244

Proton and deuteron production from low-energy pion absorption in light nuclei leading to discrete and continuum states were measured. The LEP beam line at LAMPF was used with a stack of 8 intrinsic germanium crystals. The proton energy spectra are in general characterized by a broad bump at an energy approximately corresponding to pi exp + d implies pp reaction kinematics, suggestive of pion absorption on 2 nucleons. The energy-integrated cross-section for production of deuterons has an angular distribution similar to that for production of protons. The dependence of the total pion absorption cross-section on A is explained using a semi-classical model for pion transport in nuclei. The (pi exp + ,p) as well as (pi exp + ,d) reactions generally favor transitions involving larger angular momentum transfer to the residual nucleus when states of similar nuclear structure are considered. The low-energy excitation spectra from the (pi exp + ,p) reaction are similar to the spectra from (p,d) reaction on exp 12 C and exp 13 C. However, a calculation of the (pi = ,p) cross-section using the measured (p,d) reaction with the formulation of Wilkin to relate the two reactions is in moderate disagreement with the measured (pi exp + ,p) cross-sections. The excitation spectra from the (pi exp + ,p) reaction indicte the importance of two-step processes for the reaction. The (pi exp + ,d) reaction leading to the ground state of -- residual nucleus has been seen for exp 7 Li, exp 12 C, and exp 13 C targets. The measured cross section for the exp 12 C(pi exp + ,d) exp 10 C reaction to the 2 exp + state is much higher than that for the ground state. For the case of exp 18 O, no counts were seen for excitation energy of < 10 MeV, at a sensitivity of approx. 100 nb/sr count. These features indicate a possible failure of the model of Betz and Kerman for the (pi exp + ,d) reaction. (ERA citation 05:024896)

CRN-HE-76-17 PC **A06**/MF **A01**
Strasbourg-1 Univ., (France). Centre de Recherches Nucleaires.
Study of the Reactions Antiproton-D Implies Antiproton-D pi exp + pi exp - and Antiproton-D Implies Psub(S)Antiproton-p pi exp - at 14.6 GeV/C and a Study of Charged Multiplicity Distributions.
M. E. Michalon-Mentzer. 1977, 114p
In French.Thesis.
U.S. Sales Only.

An analysis of two reactions on deuterium has been performed with incident antiprotons of 14.6 GeV/c: antiproton-d implies antiproton-d pi exp + pi exp - and antiproton-d implies psub(s)antiproton-p pi exp - . The final states are dominated by delta (1236) resonance production and in the coherent reaction the d* effect is observed as at lower incident momenta. At 14.6 GeV/c, it seems that the diffraction dissociation process as well for the incident particle as for the target takes a large part of the production mechanism for the two reactions. A study of charged multiplicity distributions in antiproton-neutron interactions is presented at 5.5, 9.3 and 14.6 GeV/c. The topological cross sections as well as various statistical moments obtained from the charged multiplicities are studied as functions of the incident momentum. A comparison between our results and antiproton-proton and pp data shows, that in the range of incident momenta used, a scaling function which describes antiproton-N and proton-proton interactions does not exist as expected from the KNO model (Koba-Nielsen-Olesen model). (Atomindex citation 09:413369)

CRN-HE-76-22 PC **A06**/MF **A01**
Strasbourg-1 Univ., (France). Centre de Recherches Nucleaires.
Study of the Inclusive Reaction K exp + Nucleus Implies K exp 0 +... At 10 GeV/C and Comparison with the Same Reaction Observed on Hydrogen.
O. Concepcion. 1976, 119p
In French.Thesis.
U.S. Sales Only.

The inclusive K production from 10GeV/c K exp + incident on the nuclei of the CERN heavy liquid bubble chamber was studied. The chamber was filled with a propane-freon mixture, giving an average mass number A approximately equal to 10. The inclusive cross section was estimated to be: 61.4+-8.5mb, corresponding to 124 mu b per event. In spite of this small statistics (497 events were retained after all the cuts), and of the small energy for the incident K exp + , the comparison between the single particle K exp 0 distributions observed on nucleus and on hydrogen shows the typical features which are seen at higher energies. First the transverse momentum distribution decreases slower for high psub(t) for the K exp 0 produced on nuclei than produced on hydrogen. Secondly, the rapidity distribution shows an increase of the differential multiplicity in the target fragmentation region, as expected. Nevertheless, the differential multiplicity in the projectile fragmentation region appears to be slightly less abundant than it was expected on the basis of high energy models. Finally, the effective number of nucleons which participate in the K exp 0 production was estimated for different cuts in the rapidity plot. It strongly decreases when going from the target to the projectile fragmentation regions. This decrease is strongly correlated with the number of fast charged tracks which are emitted with the K exp 0. (Atomindex citation 09:413362)

CSNSM-T-77-03 PC **A07**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse.
Study of Some Nuclei of the Rare Earth Transition Region (Exp 153 Gd) and the Heavy Nuclei (Exp 221 Fr and exp 225 Ac).
A. Peghaire. 1977, 147p
In French.Thesis.
U.S. Sales Only.

This work is devoted to the study of three odd mass nuclei: exp 153 Gd, exp 221 Fr and exp 225 Ac respectively located in the transitional region of rare earth and heavy elements. Experimental data have been obtained by off-line spectroscopic methods: direct gamma and electron-conversion spectra (Gd), alpha - gamma (Fr, Ac) and gamma - gamma (Gd) coincidences, angular correlation (Fr) and lifetime determinations (Fr) with a gamma Doppler shift method following alpha emission. A theoretical interpretation, based on the strong-coupling unified model, is proposed for each nuclide, to test the extension of this model into the transitional region. For this purpose a method is utilized which consists in calculating the parameters of the interacting matrix, including Coriolis effects, taking in account experimental data. After that, these calculated parameters can be compared to the predictions of the model, and give informations about the validity of the latter. This study shows that exp 225 Ac can be considered as well deformed, and that the strong attenuations of the parameters are essentially due to octupolar vibrations. The element exp 221 Fr also exhibits the characteristics of a deformed nucleus, but in this case a shape transition is appearing. Last, exp 153 Gd seems to be the lightest gadolinium element which presents the characteristics of a stable deformation. (Atomindex citation 09:410444)

DESY-L-Trans-234 PC **A05**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Quantum Chromodynamics and Hadron Jets.
Y. L. Dokshitser, and D. I. Dyakonov. Jul 79, 76p
U.S. Sales Only.

These lectures are devoted to the description of the various properties of hard scattering processes with the participation of hadrons in the framework of Quantum Chromodynamics. We discuss in detail the validity and region of applicability of perturbation theory applied to hadron processes. Particular attention is paid to the question of the structure of quark and gluon jets produced in hard processes (as an example, e exp + e exp - annihilation into hadrons). In addition to giving a pedagogical review, we also present new results. (Atomindex citation 11:504024)

DESY-L-Ueb-233 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Yang-Mills Fields, Instantons, and Tensor Products of Instantons.
V. G. Drinfeld, and Y. I. Manin. Apr 79, 13p
In German.

U.S. Sales Only.

A novel description of instantons as fields over the monopoint superspace is introduced. This construction is used in calculating the tensor product of instantons and their Green's functions. (Atomindex citation 11:503265)

DESY-T-78/01 PC **A05**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Radiative Transitions and Gluon p-Wave Annihilation in Heavy Quark-Antiquark Systems.
Diss. (D.Sc.),
H. Krasemann. May 78, 99p
In German.
U.S. Sales Only.

The author calculates the radiative widths of the charmonium using the standard model of quantum chromodynamics. Dipole sum rules are derived in particular as well as gluon jets using p-wave decays. (Atomindex citation 11:504065)

DESY-78/47 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Jet-Like Distributions from the Weak Decay of Heavy Quarks.
A. Ali, J. G. Koerner, G. Kramer, and J. Willrodt. Sep 78, 34p
U.S. Sales Only.

We consider the production and weak decay of a pair of heavy quarks (mesons) in e exp + e exp - experiments and study their effect on the various jet distributions. The relative magnitudes of the two-quark-jet and three-quark-jet final states, in the decay of a heavy quark are estimated in the framework of an SU(2)L x U(1) model. We find that the three quark configuration dominates over the two quark configuration. For the quark jets resulting from the weak decay of the heavy quarks, we calculate the jet distributions in Sphericity, Sphericity and Thrust for the process e exp + e exp - implies Qanti Q exp - implies 6 quarks. These distributions are compared with the corresponding quantities from the non-perturbative process e exp + e exp - implies q anti q and the QCD process e exp + e exp - implies q anti qg. We find that the weak decay of heavy quarks is the dominant mechanism for jet broadening in e exp + e exp - experiments, in the intermediate energy region relevant for PETRA and PEP. (Atomindex citation 10:435080)

DESY-79/38 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Searching for Higgs at PETRA Using the Wilczek Mechanism.
A. Ali, and G. Mikenberg. Jul 79, 14p
U.S. Sales Only.

We present numerical estimates for the various signatures of a neutral Higgs particle produced in the radiative decays V implies H + gamma of a heavy vector onium state V (=J/psi,UPSILON,UPSILONt). We suggest enhancement of the Higgs signal by requiring a correlation with weakly decaying states (tau, charm, bottom) or with strange particles from charm and bottom. Rates for the processes e exp + e exp - implies V implies H + gamma implies >= 1 lepton + gamma + anything, >= 2 kaons + gamma + anything are presented, and the effects of the lepton energy cuts on the first of the two processes are evaluated. (Atomindex citation 11:503983)

DESY-79/40 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Computation of Quantum Fluctuations of Quark Fields in an Arbitrary Yang-Mills Instanton Background.
B. Berg, and M. Luescher. Jul 79, 37p
U.S. Sales Only.

We explicitly compute the determinant of the Dirac operator in a general multi-instanton background field. (Atomindex citation 11:503998)

DESY-79/45 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Parity Determination for the New Generation of Heavy Neutral Mesons.
N. P. Chang, and C. A. Nelson. Jul 79, 14p
U.S. Sales Only.

We consider how best to determine experimentally the parity quantum number of a new heavy neutral meson, including the possibility of exotic J/sup PC/. Multiquark and gluonium states can have exotic J/sup PC/ quantum numbers forbidden to the non-relativistic q anti q system. If only the existence of easily identifiable two-body hadronic modes is known, it is not possible to establish the parity, so an 'exotic' meson, J>O, could be misidentified as a 'normal' meson. Direction-linear polarization coefficients, which would identify the parity, are also found to be small for e anti e implies 1 exp -- implies 1 exp -+ + gamma , 0 exp +- + gamma with the high energy photon externally converting into an e anti e pair. However, important parity tests do exist, independent of the polarization state of the decaying particle, which can be used to settle the confusion. These are listed in Part III of this paper. (Atomindex citation 11:504012)

DESY-79/52 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Excluding Scalar Gluons.
K. Koller, and H. Krasemann. Aug 79, 11p
U.S. Sales Only.

We investigate the Dalitz plot population and thrust angular distribution for the Orthoquarkonium decay Q anti Q implies 3 scalar gluons. The Dalitz plot for scalar gluons is populated in corners where events are 2 jet like, and this result disagrees with existing UPSILON data. The scalar gluon thrust angular distribution is also in striking disagreement with the UPSILON data and so scalar gluons are completely ruled out. (Atomindex citation 11:504062)

DOE/ER/10516-T2 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Physics.
New Optimal Polynomial Theory for NN-Scattering.
T. A. Rijken, and P. Signell. 36p
Contract AC02-79ER10516

A new optimal polynomial theory for nucleon-nucleon scattering is presented. For the first time in nucleon-nucleon scattering, the derivative amplitudes originally introduced by Fubini, Furlan, and Rosetti are applied. Based on the properties of these amplitudes we introduce K-matrix functions which have suitable analyticity properties as functions of cos theta, where theta is the center of mass scattering angle. The K-matrix functions enable introduction of a new set of functions for which the optimal mapping techniques of Cutkosky, Deo and Ciulli can be applied. Results are shown for proton-proton phase shift analyses at 210 and 330 MeV. (ERA citation 05:024844)

DOE/ER/10516-T3 PC **A02**/MF **A01**
Hope Coll., Holland, MI.
Optimized Polynomial Expansions: Potentials and Phase Shift Analyses.
D. Marker, T. Rijken, G. Bohannon, and P. Signell. 18 Mar 80, 18p
Contract AC02-79ER10516

The Cutkosky-Deo-Ciulli-Chao Optimized Polynomial Expansion as applied to the proton-proton scattering amplitudes was examined. Chao's positive numerical results for intermediate energy scattering data could not be reproduced. Instead, a negative conclusion as to the method's usefulness for that application was reached. Source(s) of the discrepancies with Chao's results could not be located definitely, but there were indications of a problem with a relative phase. The ability of the method to predict the higher angular momentum parts of the amplitudes for three different potentials having realistic parts was also examined. Again, the method was found to have very meager successes. 7 tables. (ERA citation 05:024871)

DP-MS-79-106 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Energy Dependence of the exp 238 U Thermal Capture Cross Section.
N. P. Baumann, and M. Owais. 1980, 19p CONF-800607-34
Contract AC09-76SR00009
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Integral activation measurements supported the thermal neutron energy dependence of exp 238 U assumed in the ENDF/B-IV evaluation. The activation measurements were conducted in a thermally insulated graphite block at the side of the SP Reactor. The block was thermally heated to temperatures up to 450 exp 0 C. In addition to heating, gasolinium filters were used to tailor the neutron spectra incident on the foils. The metallic foils consisted of copper and depleted uranium. Copper served as the 1/v reference. Activation ratios of exp 238 U to exp 63 Cu in the tailored spectrum were compared with corresponding ratios in a well thermalized flux at room temperature. The difference in this ratio is strongly dependent on the energy dependence of the exp 238 U cross section. 8 figures, 1 table. (ERA citation 05:024936)

EFI-221(13)-77 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Angular Distribution of B and C Parameters of Normalized Invariant Cross Section rho=C exp(-BP Exp 2) of the gamma + A Implies P + A' Reaction at Maximum Energy of Bremsstrahlung gamma Quanta 4.5 GeV.
K. V. Alanakyan, M. D. Amaryan, R. A. Demirchyan, K. Sh. Egiyan, and M. C. Ogandzhanyan. 1977, 11p
U.S. Sales Only.

New experimental data on the inclusive photoproduction of protons on exp 12 C, exp 63 Cu and exp 208 Pb nuclei with gamma quanta hremsstrahlung of maximum energy 4.5 GeV are given. For the protons in (0.39-0.80) GeV/c momentum interval and lab. angles 20 deg - 160 deg the invariant normalized function rho = 1/sigmat E/P d exp 2 sigma/d omega dPQ, where sigmasub(t) is total photoproduction cross section of hadrons, E and P are the total energy and momentum of the proton, Q is the number of equivalent gamma -quanta, is approximated by rho=C exp(-P exp 2). The angular dependence of the obtained experimental values for the parameters B and C are given. The possibilities of the comparison of the obtained experimental results with the results of theoretical attempts made to explain the production of cumulative particles are discussed. (Atomindex citation 10:420101)

FEI-803 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Mean Kinetic Energy of Nuclear Fission Fragments.
V. G. Vorob'eva, B. D. Kuz'minov, and V. N. Manokhin. 1977, 35p
In Russian.
U.S. Sales Only.

The experimental data on average kinetic energies of fragments at fixed nucleon composition and excitation energy of fissile intermediate nuclei from exp 141 Pr to exp 175 Lu and heavy nuclei from exp 182 W to exp 246 Cm are systematized. The fission reactions permitting preliminary nucleon emission are used. The numerical data are reduced to a common standard - the average kinetic energy of the fragments in the spontaneous fission of exp 252 Cf (186.3+-1.0) MeV. (Atomindex citation 10:436081)

FEI-833 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Some Methods of Parametrization of Complex Decay Curves.
M. Z. Tarasko, A. A. Shimanskij, and B. P. Maksyutenko. 1978, 12p
In Russian.
U.S. Sales Only. Microfiche copies only.

Three methods of parametrization of complex decay curves are compared from the point of view of the correspondence of estimates obtained to the requirement of "non-shift" and efficiency. Pseudoexperimental curves were calculated on the ideal curve by the Monte-Carlo method and were processed at the fixed period values and the

known real values of group outputs. A new program on the basis of an accelerated method of the least directed discrepancy is proposed. The estimates of parameters on this program correspond completely to the "non-shift" requirement and have a minimum selective dispersion, i.e. are the most effective ones. (Atomindex citation 11:497534)

FRNC-R-58 PC **A03**/MF **A01**
Paris-6 Univ. (France). Lab. de Physique Nucleaire et de Hautes Energies.
Boson Spin Tests from Sequential Decays Spin-Parity Analysis of the F sub 1 Meson.
P. Minnaert, L. de Billy, H. Briand, J. Duboc, and F. Levy. 45p
U.S. Sales Only.

A complete set of spin-parity tests from angular correlations and positivity conditions in the sequential decay J/sup P/ implies 1 exp - 0 exp - , 1 exp - implies 0 exp - 0 exp - is established. These tests are applied to the F sub 1 meson produced in the reaction antipp implies F sub 1 omega at an average value of momentum 1.7 GeV/c. The analysis of the joint decay of the final state F sub 1 implies K*K, K* implies K pi and omega implies pi exp + pi exp - pi exp 0 indicates that the spin-parity J/sup P/ of the F sub 1 belongs to the abnormal series. It excludes the possibility J/sup P/ =1 exp + and favours strongly the assignment J/ sup P/=2 exp - . (Atomindex citation 11:504200)

FRNC-TH-705 PC **A07**/MF **A01**
Paris-7 Univ., 75 (France).
Study of Systems of a Few Valence Nucleons in the Framework of the Shell Model.
H. Hussein. 1977, 127p
In French.Thesis.
U.S. Sales Only.

Simplified methods to calculate the shell model and the dynamics of few valence nucleon systems are presented. Danos's graphical method, the invariant matrix elements and the N-body problem in the shell model, the extension to the proton and neutron systems, simple structures and spectroscopic factors are exposed in a first part. The study of the solutions for few-valence-nucleon systems shows the general character of the dynamics of the nuclei with neutron and proton open shells. The results present the role of the alignment of the nucleon angular momenta in the spectroscopic characteristics and the independence of some nuclear properties with respect to sub-shell constitution and the number of interacting nucleons. The three usual approximations-alignment schemes with oblate or prolate ellipsoidal deformation and seniority scheme-have been tested. The theoretical results obtained in this study are sufficiently general for utilization in concrete examples. (Atomindex citation 09:406410)

FRNC-TH-739 PC **A09**/MF **A01**
Paris-11 Univ., Orsay (France).
Duality and Factorisation in Diffractive Dissociations.
M. Souza. 1977, 181p
In French.These (D. es S.).
U.S. Sales Only.

A trial analysis of the mechanism that creates diffractive systems is presented. The t-channel point of view is adopted, namely the description of the diffractive processes by exchange of the Pomeron in the crossed channel the duality concept playing a prime role in the work as a whole. A dualized three-component Deck model (D3CDM) is suggested for describing the nucleon dissociation process in the N pi system. The fundamental ingredient in the building of this model springs from the contributory addition to the Deck model of the direct term, in other words of the elastic scattering of the initial state on the target followed by its dissociation (a implies a* pi). This mechanism produces a line of zeros in the space of the three variables: mass, momentum transfer and Cos Theta. The mass-slope-Cos Theta correlation observed experimentally is only the outcome of the existence of mobile zeros. The comparison with the experiment is satisfactory. Further, the addition of the third component improves still more the distribution in the other variables. During the generalization of the model (D3CDM) there is a discussion on the systematics of the mass-slope correlation and the prescriptions of Born's term. A generalization to the diffractive double dissociation p pi exp - p pi exp - of the three-component Deck model is suggeested, and a critical study is made of the factorization of the Pomeron. By allowing for the secondary contributions suggested by the duality diagrams, it is shown how it is possible to obtain interference effects between the dominant contribution of the double Pomeron- pi exchange and that of the double B-meson (the pi degeneracy partner) and omega exchange. The importance of the Reggeon-Reggeon-Particle vertex phase of this latter contribution is shown. The cross-over is obtained correctly when the Deck graph of the pi exchange is adjusted by the contribution of the secondary trajectories, in good agreement with the experiment. (Atomindex citation 11:504121)

FRNC-TH-776 PC **A05**/MF **A01**
Paris-11 Univ., Orsay (France).
Study of the (Exp 16 O, exp 12 C) and (Exp 16 O, exp 14 C) Transfer Reactions on the Even-Even Isotopes of Samarium Near the Coulomb Barrier.
G. Marchesseau. 1978, 86p
In French.These (3e Cycle).
U.S. Sales Only.

The (exp 16 O, exp 15 N), (exp 16 O, exp 14 C) and (exp 16 O, exp 12 C) reactions at 66 MeV on all the even isotopes of samarium: exp 144 Sm, exp 148 Sm, exp 150 Sm, exp 152 Sm, exp 154 Sm were studied systematically. The energy window positions, angular distributions and integral cross-sections were measured. Data are thus available on all these nuclei from the spherical exp 144 Sm to the permanently deformed exp 154 Sm, through that of the transition region exp 150 Sm. In the passage from the spherical to the highly deformed target the variation of certain parameters could be explained by the volume increase alone. The Q-optimum values (center of gravity of the enegy distributions) reveal no effect attributable to deformation. On the other hand the angular variation of Q-optimum seems to correspond to a lowering of the Coulomb barrier as the mass of the target increases. Finally the integral cross-section variation showed quite different behaviors for the two reactions studied: whereas the alpha transfer remains practically constant the transfer of two protons increases through the neutron shell. This is probably an indication of the important part played by the 2p-2n configurations. (Atomindex citation 11:501638)

FRNC-TH-802 PC **A07**/MF **A01**
Paris-11 Univ., Orsay (France).
Determination of the Nuclear Electric Charge Distribution of Samarium Isotopes 144, 148, 150, 152, 154 by the Muonic Atom Method.
P. Barreau. 1977, 127p
In French.These (D. es S.).
U.S. Sales Only.

The theory of the nucleus-negative muon system in the case of electrical interactions is discussed. The interactions of muons with the samarium isotopes 152, 154, 144, 148, 150 are investigated. After a description of the experimental device, from muon beam production to data acquisition (detection of the gamma spectra), the results are analyzed and the nuclear charge distribution parameters determined: for each isotope the absolute value of c (half-density radius) and t (skin thickness); for exp 152 Sm and exp 154 Sm the parameter beta sub 2 (quadrupolar defomation). Nuclear polarization was accounted for throughout the analysis. (Atomindex citation 11:501588)

FRNC-TH-804 PC **A05**/MF **A01**
Paris-11 Univ., Orsay (France).
Experimental Determination of the Lifetimes and Parities of the Yrast States of exp 60 Ni. Study of Shape.
M. G. Moyat. 1978, 92p
In French.These (3e Cycle).
U.S. Sales Only.

The two methods used to measure the lifetimes of the Yrast states of exp 60 Ni are described: the Doppler attenuation method (line deformation) and the recoil range method. The lifetimes obtained for the levels at 2505, 4262, 5345 and 6807 keV are given, together with the transition probabilities inferred. The parities of the exp 60 Ni high-spin levels measured by the linear polarization method are also given. Finally the recent theoretical approaches relating to the shapes of the nuclei are outlined: K. Kuman's deformed quasi-particle model and the interaction boson approximation of A. Arima and F. Iachello. (Atomindex citation 11:501642)

HMI-B-272 PC **A02**/MF **A01**
Hahn-Meitner-Inst. fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Kern- und Strahlenphysik.
Dissipative Phenomena in Deep Inelastic Heavy Ion Collisions.
D. H. E. Gross, H. J. Krappe, K. H. Lindenberger, R. Lipperheide, and K. Moehring. Jan 78, 22p
U.S. Sales Only.

During this meeting the following theoretical concepts for deep-inelastic heavy ion reactions were discussed: the energy transfer and friction, direct or statistical mechanisms, dissipation and fluctuation. (Atomindex citation 10:425050)

IAE-2964 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Study on gamma -Radiation Accompanying alpha Decay of exp 235 U and beta exp - Decay of exp 231 Th.
S. A. Baranov, V. M. Shatinskii, A. G. Zelenkov, and V. A. Pchelin. 1978, 13p
In Russian.
U.S. Sales Only.

Study on gamma radiation accompanying radioactive decay of exp 235 U and exp 231 Th was carried out with the help of semiconductor detectors and electronic apparatus. 102 gamma bands were detected in gamma spectra. Joint analysis of the spectra obtained permits one to attribute 50 of them to exp 235 U gamma decay, the remaining gamma bands are connected with the beta -decay process of the above thorium isotope. Many of the gamma bands observed were detected for the first time. Tables of E/sub gamma / and I/sub gamma / values are presented. The scheme of energy levels of the exp 231 Th nucleus was built up using the experimental data. The advantage of the measuring equipment is a high accuracy of gamma-radiation energy measurements (0.1 keV preferable). Errors of determination of level energies in exp 235 U gamma-decay investigation amount 3-4 keV. (Atomindex citation 10:451177)

IAE-2967 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Levels of alpha -Cluster Structure in an exp 16 O Nucleus over an Excited Core.
Yu. A. Glukhov, K. V. Karadzhev, and V. I. Man'ko. 1978, 12p
In Russian.
U.S. Sales Only.

Excitation functions and angular distrbutions of alpha particles in exp 12 C(alpha , alpha sub 2) exp 12 C* inelastic scattering in the 15.6 - 22 MeV energy range of incident alpha particles were studied on tandem electrostatic accelerator of the Institute of Nuclear Physics (Bucharest, SRR). At energies of 16.95, 18.3, 19.8, and 21.6 MeV resonances were found, moments and parities of which were equal to 4 exp + , 4 exp + , 3 exp - and 5 exp - , respectively. The given scattering widths in the alpha sub 2 -channel for these states amounts 0.37, 0.17, >0.10 and 0.17, respectively, which result testifies that apparently those are alpha - cluster states built on the second excited state of the exp 12 C nucleus. (Atomindex citation 10:451205)

IAE-2972 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Polarization Effects in the Decay.
Yu. V. Gaponov. 1978, 19p
In Russian.
U.S. Sales Only.

The modern state of experiments on beta decay of polarized nuclei is reviewed from the point of view of studying the structure of the effective hamiltonian of the weak interaction and the peculiarities of

series of isobaric states of the p n-bar and n p-bar type. Problems on realization of the complete experiment and of the evaluation of the contribution of the S and T variants of beta interaction are considered along with, the experiments on second-class currents and the information on the structure of isobaric series with various moments: 0+-, 1+-, 2-. The main attention is paid to new possibilities on the experiments with polarized nuclei at the SPIN device. (Atomindex citation 11:501479)

IAE-2974 PC A03/MF A01
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Fluctuations of Total Neutron Cross Sections and Reference States.
V. K. Sirotkin, and Kh. R. Fernandes Dias. 1978, 32p
In Russian.
U.S. Sales Only.

Various physical causes of neutron total cross section fluctuations are considered. For this aim elastic scattering of nucleons on nuclei is considered in the framework of the shell approach with the help of the Green functions formalism, which allows one to develop a general approach to the description of fluctuations of total cross sections in a different scale. Various mechanisms of fluctuations of the self-energy part of the cross section and those of the total cross section are considered. It is shown that odd-particle account leads to the dependence of cross sections and strength functions on the spin of levels of a compound nucleus. Effect of reference states on the behaviour of total cross sections is studied. Both insulated and overlapping reference states are considered. The correlations obtained are used for analyzing total cross section fluctuations in the nuclei region of 16 <= A <= 40. In this region transition from isolated reference states to overlapping ones takes place at small energies of incident nucleons along with the change of fluctuation cross section mechanisms. (Atomindex citation 10:454026)

IC-77-109 MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Unified Models Based on Elementary Weyl Fields.
P. Budini. Sep 77, 9p
U.S. Sales Only. Microfiche copies only.

It is supposed that elementary interactions act between multiplets of left-handed Weyl fields, labelled by flavour, and right-handed ones, labelled by colour quantum numbers. The possibility of obtaining parity-conserving e.m. and strong interactions between Dirac spinors and charge quantization is shown. The unobserved interactions can be forbidden at the elementary level, avoiding the introduction of very massive gauge bosons, by generalizing the Konopinski-Mahmoud model for leptons. (Atomindex citation 09:415139)

IC-77-143 PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Linear Spin-Zero Quantum Fields in External Gravitational and Scalar Fields. Part 2. The Description of Dynamics in the Generic Case.
B. S. Kay. Nov 77, 36p
U.S. Sales Only.

A general formalism for quantizing the covariant Klein Gordon equation in an arbitrary globally hyperbolic space-time is presented. It is argued that much of the conceptual confusion surrounding "quantum field theory in curved space-time" has been caused by the misapplication of a quantization procedure (the single representation formalism) which is really only suitable for quantizing stationary systems. Drawing on a close analogy with time-dependent external field problems in flat space-time, it is argued for the introduction of a new quantization procedure: the many vacuum formalism which accommodates non-stationary situations. In the many vacuum formalism, a whole family of different representations of the field algebra plays a role and dynamics is necessarily described in terms of isomorphisms between different algebras rather than automorphisms of a single algebra. It is shown how this many vacuum approach gives physically sensible results in the flat space-time case. In the curved space-time case, corresponding well defined formalism is obtained relying on rigorous results established in I. A principal feature is that a different vacuum state is obtained for each choice of Cauchy surface together with a choice of lapse and shift functions on that surface. Several questions-mathematical and interpretational- raised by the scheme are discussed. (Atomindex citation 09:415193)

IC-77-27 PC A02/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Scattering of High-Energy alpha Particles on exp 12 C.
I. Ahmad. Apr 77, 22p
U.S. Sales Only.

Glauber multiple scattering theory is applied to analyse the elastic and inelastic scattering of 1.37 GeV alpha particles on exp 12 C. An approach which treats the N- alpha amplitude at the incident nucleon kinetic energy equal to the alpha -kinetic energy per particle as the basic interaction is adopted. Using the gaussian model for exp 4 He to obtain the N- alpha amplitude in terms of the NN amplitude, it is found that, in general, the experimental data are qualitatively explained. However, large discrepancies in terms of the magnitude of the cross-sections in the small angle region and the positions of the minima in the angular distribution at larger angles are generally present. Effects of the two-body correlations in the projectile as well as in the target are also investigated. (Atomindex citation 09:416387)

IC-78-18 PC A02/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Tensor Forces in the Three-Body Problem.
A. Osman. Jun 78, 14p
U.S. Sales Only.

The three-body problem is considered using separable two-body interactions. The two-body potentials used contain both attraction and repulsion, each of the attractive and repulsive parts of the two-body potentials also includes tensor forces. The effect of the tensor forces is investigated by making use of the separable approximation. By introducing the separable expansion in the three-body problem, the Faddeev equations are reduced to a well-behaved set of coupled integral equations. The integral equations obtained are solved numerically using separable two-body interactions with potential functions of the Yamaguchi, Gaussian, Tabakin, Mongan and Reid forms. The calculated values of the binding energies for the nuclei exp 3 H, exp 3 He and exp 6 Li are in good agreement with the experimental values. The effect of the tensor forces is found to improve the binding energy by about 4.491%-8.327%. (Atomindex citation 11:503339)

IC-79-20 PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Low-Energy Photo- and Electroproduction for Physical Pions. Ward Identity and Chiral Breaking Structure.
J. T. MacMullen, and M. D. Scadron. Feb 79, 38p
U.S. Sales Only.

The Ward identities of current algebra are combined with gauge invariance constraints, on-shell PCAC and the Bjorken limit to obtain the low-energy expressions of the pion photo- and electroproduction invariant amplitudes for physical pions. (Atomindex citation 11:504081)

IC-79-21 PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Low-Energy Photo- and Electroproduction for Physical Pions. Photoproduction Phenomenology and Extraction of the Quark Mass.
J. T. MacMullen, and M. D. Scadron. Feb 79, 35p
U.S. Sales Only.

The background resonance delta (1230), N/sup */(1520), N/sup */(1470) and N/sup */(1535) pion and axial-vector amplitudes are first calculated in the soft-pion and on-shell configuration, respectively. Then a comparison is made with the usual soft pion theorems and on-shell low-energy expansions of current algebra as worked out in the previous paper. The agreement is good, and we also deduce a nucleon dipole form factor axial-vector mass of m/sub A/ approximately equal to 1.23 GeV. Finally an approximate value for the non-strange current quark mass of m equal to 0.64 +- 1.11 mu is extracted from the data. (Atomindex citation 11:504082)

IC-79-24 PC A02/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Gluon Corrections to Non-Leptonic Hyperon Decays.
Mar 79, 14p
U.S. Sales Only.

Gluon exchange corrections to non-leptonic decays are estimated in the non-relativistic quark model. These corrections to the dominant contribution, which arises from quark-quark scattering through exp +- W exchange previously considered, are rather important and in the right direction. Within the framework of the current-current picture with (V-A) charged currents, not only the delta I equal to 1/2 rule follows for the matrix elements B/sub s/ vertical bar H/sub W//sup pc/ vertical bar B/sub r/ in our approach, but also the scale comes out to be right so as to compensate the Cabibbo suppression factor sintheta/sub s/. The D/F ratio for the above matrix elements comes out to be -0.8, which can fit both p-wave and s-wave amplitudes. (Atomindex citation 11:503349)

IFIN-HE-92-1977 PC A02/MF A01
Institutul de Fizica si Inginerie Nucleara, Bucharest (Romania).
Observation of the Shadowing and Antishadowing Effects in Pion-Nucleus Interactions.
D. B. Ion, and F. Nichitiu. Dec 77, 8p
U.S. Sales Only.

The shadowing and antishadowing effects in the pion-nucleus interaction are investigated by using the available experimental data and the recent interpolations of the pi exp + - p total cross sections. Pronounced shadowing is found in the energy regions of pion-nucleon resonances while the antishadowing effects are systematically observed at energies between two resonances. (Atomindex citation 10:460184)

IFVE-OEF-78-64 MF A01
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Measurement of Longitudinal Polarization of Direct Muons Produced in NN Collisions at P/sub Perpendicular/ = 1.9 GeV/C.
V. V. Abramov, A. V. Alekseev, and S. I. Bityukov. 1978, 16p
In Russian.
U.S. Sales Only. Microfiche copies only.

The experiment on the measurement of direct muon yield and their longitudinal polarization in pN interactions is described. The polarization has been determined by measuring forward-backward decay asymmetry of muons stopped in the multilayer scintillation detector, placed in transverse magnetic field, and is equal to nu /sub x/ = -0.41+-0.17. The value for mu exp + / pi exp + has been measured in three independent experiments and amounts to (7.0+-1.1)x10 exp -5 . (Atomindex citation 11:501395)

IFVE-OEIPK-77-44 PC A02/MF A01
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
CP-Violation in Quark Model.
Z. R. Babaev, V. S. Zamiralov, and A. Yldyz. 1977, 20p
U.S. Sales Only.

A theoretical-group origin violation of Cp-invariance effect in the multiquark models has been investigated. It is shown that CP-violation arises from generalization of weak interaction universality principles, and CP-violation parameters are of the same sense as the Cabibbo angles. Four- and six-quark models are treated in detail. The proposed formalism automatically includes all the phase

transformations of physical fields. As a consequence the real number of physical parameters is defined right away in an arbitrary SU(n) quark model. (Atomindex citation 09:406153)

IFVE-OEIPK-78-140 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Study on the Two-Particle Rapidity Correlations in K exp - p Inclusive and Semi-Inclusive Reactions at 32 GeV/C.
V. V. Babintsev, M. Yu. Bogolyubskii, and V. A. Bumazhnov. 1978, 27p
In Russian.
U.S. Sales Only.

The rapidity correlations between like and unlike charged particles were studied in K exp - p interactions at 32 GeV/c. It was found that correlation function C/sub SR/ exp +- (Y sub 1 ,Y sub 2) has maxima at Y sub 1 =Y sub 2 approximately equal to -0.8 and Y sub 1 =Y sub 2 approximately equal to 1.2 and a dip in the central region, which disappears for the pions with P/sub T/ > 0.3 GeV/c. Between P/sub T/ of two like charged pions at small angle phi sub 12 there were found positive short-range interference correlations, which reach the maxima at the same rapidities, as correlation function C/sub SR/ exp ++ (Y sub 1 ,Y sub 2), C/sub SR/ exp -- (Y sub 1 ,Y sub 2). (Atomindex citation 11:501405)

IFVE-OEIPK-78-37 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Investigation of Particle and Resonance Production Mechanisms in pi exp + p, K exp + p and Pp Interactions at 200-350 GeV by Means of the European Hybrid Spectrometer (Letter of Intent).
E. P. Kistenev, V. V. Knyazev, A. K. Likhoded, N. G. Minaev, and B. F. Polyakov. 1978, 23p
In Russian.
U.S. Sales Only.

The program is given of physical studies of pi exp + p, K exp + p and pp interactions at 200-350 GeV at the 400 GeV CERN accelerator with the European hybrid spectrometer (EHS). A quick-cyclic bubble chamber and secondary charged track spectrometer constitute the base of the EHS. The aim of the experiment is to analyze inclusive cross-sections and resonance state spectra within the range of quark-parton model, and to analyze the causes of scaling breaking in the central and fragmentation regions. The investigations are supposed to be carried out to study correlation effects of directly produced particles and resonances, pair resonance production in the valence quarks and quarks out of "sea" and baryon production aimed at finding out the function o, diquark structures in initial hadrons. The planned level of statistics for the experiment first stage will be achieved by the end of 1981. (Atomindex citation 10:428595)

IFVE-OEIPK-78-42 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Impact Parameter Bounds and Transverse Momentum Correlations for Exclusive Multiparticle K exp + p Reactions at 32 GeV/C.
E. De Vol't, F. Verber, and M. Gisen. 1978, 39p
In Russian.
U.S. Sales Only.

Analysis of transverse momentum correlations and of several lower bounds on the r.m.s. impact parameters for four-, six- and eight-body exclusive K exp + p reactions at 32 GeV/c is presented. The comparison with the lower energy data at 8.2 and 16 GeV/c is made. The different lower bounds remain very small in comparison with the r.m.s. impact parameter inferred from elastic scattering data; hence, it seems likely that spin and/or phase structure of the reaction amplitude contributes considerably to the value of the r.m.s. impact parameter for inelastic reactions. (Atomindex citation 11:501409)

IFVE-OEIPK-78-58 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Inclusive pi exp 0 Meson Production in the K exp + p Interactions at 32 GeV/C.
I. V. Azhinenko, Yu. A. Belokopytov, and A. A. Borovikov. 1978, 23p
In Russian.
U.S. Sales Only.

Inclusive and semi-inclusive distributions of gamma quanta and pi exp 0 mesons are presented and discussed for the K exp + p implies gamma + X and K exp + p implies pi exp 0 + X reactions at 32 GeV/c. The comparison with inclusive pi exp - meson production reveals significantly higher pi exp 0 -meson cross sections in the regions of low momentum. The total inclusive cross section of pi exp 0 meson production increases strongly with energy. The comparison of the data obtained with other experimental results shows that average pi exp 0 -meson multiplicities are practically equal for K exp + p, K exp - p and P exp - p interactions at 32 GeV/c. The quark model calculation of particle production through the mechanism of quark fusion for total inclusive cross sections of pi exp 0 and pi exp - mesons and for inclusive distributions of pi exp 0 mesons revealed good conformity of experimental and theoretical data. (Atomindex citation 11:501403)

IFVE-OEIPK-78-74 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Study of the Dimensions of the Pion Emission Region in K exp - p Interactions at 32 GeV/C.
V. V. Babintsev, T. M. Bryukhanova, and M. Yu. Bogolyubskii. 1978, 16p
In Russian.
U.S. Sales Only.

The space-time characteristics of the multi-pion emission region were studied in K exp - p interactions at 32 GeV/c by the Kopylov-Podgoretsky method. It was found that the radius R of the pion emission source is about 1 F, both for pi exp + pi exp + pairs and for pi exp - pi exp - pairs, and this estimate is practically independent of background definition, whereas the estimate of the meson source lifetime tau shows a certain dependence on the choice of background. (Atomindex citation 11:501404)

IFVE-ONF-78-116 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Reconstruction of the IHEP Neutrino Beam Energy Spectrum.
A. P. Bugorskii, A. S. Vovenko, A. A. Volkov, V. G. Kartasheva, and V. I. Kochetkov. 1978, 15p
In Russian.
U.S. Sales Only.

The procedure of reconstructing the IHEP neutrino beam energy spectrum is described. The method of direct calculation for pi and K meson yields from a real target is used. Mistakes in neutrino spectra are determined using the comparison of experimentally measured muon fluxes and calculated ones. They amount to 8% in neutrino spectrum for pi -meson decays and 11% in neutrino spectrum for K-meson decays. (Atomindex citation 11:501407)

IFVE-ONF-78-51 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Weak Interaction of Sequential Heavy Leptons and Mixing in the Framework of SU(N) Group.
Z. R. Babaev, and V. S. Zamiralov. 1978, 20p
U.S. Sales Only.

A general method to construct a mixing scheme of sequential light and heavy lepton states (sequentons in weak interactions in the framework of SU(n) symmetry group) with SU(2)xU(1) gauge group is proposed. SU(4) and SU(6) groups are considered in detail. It is shown that the sequential introduction of heavy leptons in the SU(6)-symmetry with the use of existing physical data admits heavy lepton production in nu N-collisions with the intensity of approximately(tg alpha) exp 2 (alpha < or approximately THETA/sub c/). Other possible physical consequences of the proposed mixing schemes of lepton states, in particular, possible differences in coupling constant values of weak lepton decays are discussed too. (Atomindex citation 11:503991)

IFVE-ORI-78-27 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergii.
Angular Distribution of Hadrons Produced by 69 GeV Protons on External Targets.
G. I. Krupnyi, V. S. Lukanin, E. G. Mal'tseva, Ya. N. Rastsvetalov, and G. I. Semenova. 1978, 15p
In Russian.
U.S. Sales Only.

Studied are angular distributions of integral characteristics of secondary hadrons generated by 69 GeV protons on aluminium, copper and tungsten targets of different sizes. Measurements were made on an extracted proton beam. The comparison of results for thin and thick targets indicates that the secondary radiation outputs increase with the target thickness along the beam, especially at large angles. The outputs also increase as the target atomic number increases. The output of hadrons with E > 2 GeV from the thin target for one interacting proton is higher than that from the thick target; and at the same time the output of hadrons with lower energy thresholds is on average two times higher for thick targets, which is due to the influence of secondary interactions in the target material. (Atomindex citation 10:454107)

IFVE-OTF-77-152 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergii.
Delta T=1/2 Rule in Quark Models with Unconfined Colour.
B. A. Arbuzov, F. F. Kompaneetz, and F. F. Tikhonin. 1977, 13p
U.S. Sales Only.

In the triplet quark model with unconfined colour a weak hadronic current is obtained with the following properties: a) it satisfies weak SU(2) algebra; b) the neutral current is completely diagonal and coincides with electromagnetic one in the quark structure ; c) the "white" part of the current possesses the properties of the Cabbibo current. The properties of the "white" part of nonleptonic Lagrangian derived from this current are : a)between the coefficients of the transition amplitudes delta T=1/2 and delta T=3/2 there is a ratio approximately 25 corresponding to experiment; b) there are no transitions delta S=2; c) the values for the transitions delta T=0,1,2 of the Lagrangian without changes of strangeness are compatible with each other. (Atomindex citation 09:409930)

IFVE-OTF-78-166 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Electromagnetic Interaction of Hadrons with the Spin 3/2.
Yu. M. Zinov'ev, and Yu. G. Stroganov. 1978, 15p
In Russian.
U.S. Sales Only.

A phenomenological approach to describe the electromagnetic interaction of hadrons with spin 3/2 in the framework of the Rarita-Schwinger formalism has been proposed. A general one-particle equation in the external field has been constructed. Then a nonrelativistic approximation with an accuracy up to terms of order 1/m exp 2 has been considered, where m is the hadron mass. Nonrelativistic hamiltonian is obtained. It can be useful in comparison of experimental data with relativistic models of omega particle. (Atomindex citation 11:501392)

IFVE-OTF-78-173 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Impact Parameters of Inelastic Hadron Interaction at High Energies.
S. V. Semenov. 1978, 13p
U.S. Sales Only.

The expression for impact parameters of inelastic hadron-hadron interaction with a defined number

of charged particles in the final state is obtained from the absorptive model. The model satisfies the unitary condition in the direct reaction channel. The impact parameters of the inelastic pp interaction at ISR energies are calculated. It is found that the impact parameters of multiple production processes decrease with multiplicity growth and at fixed multiplicity they increase with energy. (Atomindex citation 11:501378)

IFVE-OTF-78-26 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Dipole Interaction of an Oscillator with a Scalar Field.
A. V. Razumov, and A. Yu. Taranov. 1978, 17p
In Russian.
U.S. Sales Only.

Dipole interaction of an oscillator with a scalar field in one dimensional space is considered. Solutions for classical motion equations are found, and the restriction conditions of the classical Hamiltonian from below are obtained. The diagonalization of the quantum system, described by the Hamiltonian is made. The diagonalization consisted in the change of canonical coordinates and momenta by operators, satisfying the transpositional ratios, and in the construction of the system state space, where all operators are determined. The problem of zero approximation of the perturbation theory, when the spectrum of free hamiltonian and that of total hamiltonian do not coincide, is considered for the quantum case. It is shown that in case of an exact solution the discrete spectrum is absent, the perturbation theory series begins with the ground state of the oscillator. Otherwise to produce the excited level it is necessary to begin the perturbation theory series with the corresponding excited level of the free hamiltonian. (Atomindex citation 10:442330)

IFVE-OTF-78-52 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Quadruplet Scheme of Weak Interactions.
A. G. Liparteliani, G. G. Volkov, and Yu. P. Nikitin. 1978, 27p
U.S. Sales Only.

A possibility to describe lepton and quark weak interactions on the basis of the gauge group SU(4)/sub L/xSU(4)/sub R/xU/sup Y/(1) is discussed. RH (right-handed) currents are included into weak interaction scheme. Possible ways to construct weak interaction theory in a symmetric way with respect to the LH (left-handed) (V-A) and RH(V+A) currents are sought. Neutral nondiagonal transitions that might explain heavy neutral lepton production in neutrino beams on the basis of gauge theory are discussed. The problem on mixing leptons (quarks) with different quantum numbers is discussed. Applicability of the given model is discussed in connection with some problems of neutrino interaction physics, as well as production and decay of heavy charged and neutral leptons. (Atomindex citation 11:501354)

IFVE-OTF-78-65 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Collective Coordinates Method in Canonical Formalism: Bogolyubov's Transformation.
O. A. Khrustalev, A. V. Razumov, and A. Yu. Taranov. 1978, 22p
U.S. Sales Only.

The collective coordinates method is presented in the framework of the canonical formalism. The variables which play the role of the symmetry group parameters are transformed on the operator level, and no problem of ordering arises. The transformation properties of new variables allow one to take into account symmetry properties, independently of the expansion in the perturbation theory series. Some facts of the Lie group theory are presented in a convenient form. (Atomindex citation 10:427687)

IFVE-OTF-79-29 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Adiabatic Limit in the S Matrix Approach.
V. A. Il'in, and D. A. Slavnov. 1979, 17p
In Russian.
U.S. Sales Only.

The local network of algebras of observables satisfying the Haag-Kastler axioms of isotone, local commutativeness and relativistic covariance was obtained. The local network of algebras of observables was created in the S matrix approach with the usage of intuitive considerations about the "adiabatic limit g implies 1" for the system of quantum fields. (Atomindex citation 11:503298)

IFVE-OTF-79-43 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Expansion of Scattering Amplitude at Large Momentum Transfers.
V. F. Edneral, S. M. Troshin, and N. E. Tyurin. 1979, 14p
U.S. Sales Only.

The problem of constructing an interative approximation for a hadronic scattering amplitude and the problem of searching for the related small parameter are presented in the paper. An expansion over the parameter, dependent on the momentum transfer and decreasing with q exp 2 , has been obtained for the scattering amplitude in the case of asymptotically increasing cross sections. In deriving the formula for the scattering amplitude the interaction distances b > > lambda were considered where lambda approximately 2/sup -1/2/ is the size of the corresponding well potential (central region). Here the particles are strongly coupled (g > > 1) with quantum field and confined due to that. Transition into the range of b < or approximately lambda is related to the account of hadron constituent interactions. (Atomindex citation 11:503268)

IFVE-OTF-79-58 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Discrete Symmetry in Weak Interaction.
A. G. Liparteliani, and G. G. Volkov. 1979, 11p
U.S. Sales Only.

The form of current operator O is discussed for weak charged transitions in the model with 3 or 4 left handed helicity doublets of quarks J/sub mu / exp + = anti Q(tau exp + O)R/sub mu /Q, J/sub mu / exp - = (J/sub mu / exp +) exp + , where Q is a quark column of 2n dimensionality, Q = (Q/sub u/, Q/sub d/), Q/sub u/ = (u,c,t...) are quarks with 2/3 charge. Q/sub d/ = (d,s,b...) are quarks with-1/3 charge, R/sub mu) is the operator defining the spacetime structure. The operator O satisfies the unitarity condition 00 exp + = 1. It is assumed that the consequences of the charge symmetry of the theory may greatly restrict arbitrariness in defining the operator O. This restriction leads to an additional condition for the operator O, i.e. O=O exp + . Whereof there follows a number of experimentally observable relations between the amplitudes of effective current transitions O/sub ij (u/sub i/ implies d/sub j/) = O/sub ji/*(u/sub j/ implies d/sub i/) or O sub 13 (u implies b) = O sub 31 *(t implies d); O sub 23 (c implies b) = O sub 32 *(t implies s); O sub 12 (u implies s) = O sub 21 *(c implies d). It is shown, that charge independence may lead to the following relations between the quark masses m/sub c//m/sub s/ = m/sub t//sub b/ ... (Atomindex citation 11:504073)

IFVE-OTF-79-67 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Contribution from the Far Cos theta-Plane Singularities to the Scattering Amplitude and to the Inclusive Distribution.
A. A. Logunov, M. A. Mestvirishvili, G. L. Rcheulishvili, and A. P. Samokhin. 1979, 27p
In Russian.
U.S. Sales Only.

On the basis of unitarity, polynomial boundedness over energy and analyticity of the scattering amplitude F(s,z) in z = cos theta in some fixed complex neighborhood of the physical points -1 < z < 1 it is shown that high-energy behavior absoluete value F(s,1) > = cx(lns)/sup 2 + epsilon/ is determined by the nearest to the point z = 1 amplitude singularities only. The analogous result is proved for the single-particle inclusive distribution integrated over momentum. It is shown that, if the absorptive part of the elastic scattering amplitude is analytic in z in some fixed domain with t- and u-channel cuts and sigma/sub tot/(s) > (lns) exp -1 , then the double spectral function will be sign changed on the t-channel cut. (Atomindex citation 11:503320)

IFVE-OTF-79-70 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
D Meson Inclusive Production in the E exp + E exp - Annihilation.
V. G. Kartvelishvili, A. K. Likhoded, and S. R. Slabospitskii. 1979, 9p
U.S. Sales Only.

D meson inclusive production in the e exp + e exp - annihilation is discussed. This consideration is carried out on the basis of the fragmentation functions of heavy quarks (Q=c,b) into hadrons. Summed distribution of charged and neutral D mesons in the e exp + e exp - annihilation versus the variable x = absolute value p/sub D/-vector absolute value p/sub D//sup max/-vector, where p/sub D/-vector is the D meson momentum, is presented. It is shown that the early calculated fragmentation function of the c quark into D mesons is in good agreement with new experimental data. (Atomindex citation 11:504057)

IFVE-OTF-79-72 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Early Chiral Unification.
Yu. F. Pirogov. 1979, 23p
U.S. Sales Only.

A unified model of electromagnetic, strong and weak interactions based on the semisimple gauge group G = SU(8)/sub L/ x SU(8)/sub R/ is presented. Leptons and fractionally charged quarks are assigned to fundamental representations F/sub L/ = (u/sub i/d/sub i/ nu /sub e/e)/sub L/, F/sub R/(u/sub i/d/sub i/ nu /sub e/e)/sub R/ and similarly for the other families. The model leads to low unification mass M = 10 exp 6 -10 exp 8 GeV and admissible value for the Weinberg parameter sin exp 2 THETA/sub W/ = 1/3. The model contains chiral color group SU(3)/sub L/ x SU(3)/sub R/ and permits the existence of light axial gluons (m/sub A/ approximately 1 GeV) alongside the massless vector gluons. The baryon number is conserved in the model. Triangular anomalies are absent when mirror fermions of opposite chirality are added. The model admits the hierarchy of symmetry breaking and presence of intermediate scales M/sub n/ so that M/sub W/ << M/sub n/ << M. In the low-energy region the results of the Salam-Weinberg model are reproduced. (Atomindex citation 11:504102)

IFVE-OTF-79-90 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Spin Effects in Elastic Scattering at Large Momentum Transfers.
V. F. Edneral, S. M. Troshin, and N. E. Tyurin. 1979, 9p
U.S. Sales Only.

The problem of spin degrees of freedom in hadronic elastic scattering at large momentum transfers is discussed. With such a purpose the analysis of the pp scattering in terms of the generalized reaction matrix is carried out. It is shown that scattering amplitudes without helicity flip and those with one flip of helicity have a characteristic sequence of maxima and minima. They are close in their absolute value in the whole range of momentum transfers < = absolute value t < = 10 GeV exp 2 . The scattering amplitudes with double-flip of helicity are small as compared with non-helicity flip at small momentum transfers and are large at 3 < = absolute value t < = 10 GeV exp 2 . The differential cross section of the elastic pp scattering decreases in agreement with experimental data. It is

also noted that the account of the spin structure of the scattering amplitude at large values of absolute value t is important in the analysis of the hadronic internal structure. (Atomindex citation 11:504028)

IFVE-STF-74-154 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Coherent Interaction of Leptons with Quarks in Deep Inelastic Processes.
V. V. Anisovich. 1974, 11p
U.S. Sales Only.

Coherent interactions with two or three quarks have been considered in the paper. It is shown that account of these prosesses leads to Wsub(2)sup(en)/Wsub(2)sup(ep)approximately equal to 1/3 at x approximately equal to 2/3 and Wsub(2) sup(en)/Wsub(2)sup(ep) approximately equal to 0 at x approximately equal to 1. (Atomindex citation 10:428468)

INDC(CCP)-110/LNP PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Nuclear Physics Constants of gamma-Emitting Isotopes in the Technological Environment of Reactors. Supplement to "Nuclear Constants" No. 22.
B. V. Nesterov. Mar 78, 22p
U.S. Sales Only.

A summary is given of constants for gamma-active isotopes associated with the technological environment of nuclear power plants, namely gamma line energies, absolute quantum yield per 100 disintegrations, half-lives, isotope yields for thermal neutron fission of exp 235 U and isobaric chains. The supplement covers those isotopes which are most frequently dealt with in reactor construction during calibration work involving the use of high-resolution gamma spectrometers. (Atomindex citation 09:413602)

INDC(CCP)-127/L PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Some of the Nuclear Data Research Projects Conducted by Soviet Scientists.
B. D. Kuz'minov, and G. B. Yan'kov. Nov 78, 16p
U.S. Sales Only.

This paper is a review of the nuclear data research by Soviet scientists published over the period 1977 until July 1978. (Atomindex citation 10:454108)

INIS-mf-4292 PC **A04**/MF **A01**
Mainz Univ. (Germany, F.R.). Fachbereich Physik.
Investigations of the Storage of Positrons.
D. Richter. 13 Jul 77, 55p
In German.Diss. (D.Sc.).
U.S. Sales Only.

In this paper, the possibilities for the storage of positrons are studied. Three experiments have been performed: 1) The storage of positrons coming from a fixed Co exp 58 -source placed out of the storage volume of a magnetic bottle. 2) The storage of positrons coming from Rb-ions, stored in a penning trap. The detection of the storage efficiency should be performed by resonance of the positrons in an external resonance circuit. 3) The storage of positrons coming from Rb-ions stored in a penning trap. For detection of positrons possibly stored, these are pushed out of the trap on a scintillator crystal, and the annihilation photons are displayed as a function of time. (Atomindex citation 09:384486)

INIS-mf-4293 PC **A09**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Annual Report 1976.
1976, 179p
In German.
U.S. Sales Only.

The report deals with the scientific activities at DESY in 1976 in elementary particle physics, synchrotron radiation, and the DORIS and PETRA storage rings. (Atomindex citation 09:390651)

INIS-mf-4302 PC **A03**/MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Elastic and Inelastic Form Factors of the Ne exp 20 in the Hartree-Fock Approximation.
S. A. C. de Oliveira. 1977, 49p
In Portuguese.Thesis.
U.S. Sales Only.

Properties of Ne exp 20 fundamental band are studied such as particle densities and elastic and inelastic form factors. A two body interaction is used and its matrix elements involve only the independent particle states of the 1s-0d shell. (Atomindex citation 09:385265)

INIS-mf-4303 PC **A03**/MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Tamm-Dancoff Approximation Applied to the Si exp 28.
N. F. Santos. 1974, 31p
In Portuguese.Thesis.
U.S. Sales Only.

The energy levels of the Si exp 28 nucleus are determined and the respective wave functions are utilized to calculate the probabilities of electric quadrupole transitions. (Atomindex citation 09:385271)

INIS-mf-4327 PC **A06**/MF **A01**
Technische Hochschule, Darmstadt (Germany, F.R.). Fachbereich Physik.
Investigation of the E1 and Isoscalar E2 Giant Resonance of exp 142 Nd and exp 150 Nd by Inelastic Electron Scattering.
Diss. (D.Sc.),
A. Schwierczinski. 7 Feb 77, 102p
In German.
U.S. Sales Only.

With the aid of inelastic neutron scattering, the excitation energy range for giant resonances has been studied in a spherical nucleus (exp 142 Nd) and a deformed nucleus (exp 150 Nd). In Nd, lines have been observed for Esub(x) = 8.6 MeV, 9.7 MeV, 12 MeV, and 15.4 MeV. These have been interpreted as M1, E2 or E0, E2, and E1 excitations. In exp 150 Nd, structures interpreted as M1, E2, and E1 (12.3 MeV and 16.0 MeV) excitations have been observed for Esub(x) = 8.1 MeV, 11.1 MeV, 12.3 MeV, and 16.0 MeV. (Atomindex citation 09:390827)

INIS-mf-4345 PC **A04**/MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Separable Representations of the Two Body Interactions.
Thesis,
L. H. A. Consoni. 1975, 71p
In Portuguese.
U.S. Sales Only.

It is verified how far the EST (Ernst-Shakin-Thaler) separable potential is able to reproduce the results obtained with a local potential V, by means of two or three expansion energies. (Atomindex citation 09:392653)

INIS-mf-4514 MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Generalized Spins and Theirs Applications.
M. Melnikoff. 1978, 150p
In Portuguese.Thesis (Ph.D.).
U.S. Sales Only. Microfiche copies only.

The correlation between the colinear SU(6) sub(W,STRONG) group, of classification, builded by Melosh in 1974 inside th Null-Plane formalism, and the static SU(6) group classical of classification of the Flat-Plane formalism which is a chiral SU(6) x SU(6) algebra sub-group of Feynman-Gell-Mann-Zweig, is analized. It is shown that is possible to define the 'static limit', in the weak sense, for the SU(6) sub(W,STRONG). Furthermore, rotational symmetries of the Hamiltonian H= alpha vector. p vector + m beta + omega (x) (1 + beta) + omega (x) alpha vector. x vector are wanted. It is possible to define, in the Flat-Plane formalism a conserved spin but that dont't one relate with the canonical spin by no unitary transformations. The generalized operator of total angular momentum which is conserved, in the Null-Plane formalism in its 'non-orthogonal' version, is found. A generalized spin, conserved, obtained by a exact Melosh transformation appropriate for the case is also found. (Atomindex citation 09:412400)

INIS-mf-4563 PC **A06**/MF **A01**
Vrije Univ., Amsterdam (Netherlands).
High Resolution Investigation of exp 90 exp 91 exp 92 Mo and exp 87 exp 88 Sr by (P,T), (P,D) and (P,p') Reactions.
E. J. Kaptein. 1978, 112p
U.S. Sales Only.

Direct reactions have been carried out to study exp 90 Mo, exp 91 Mo, exp 92 Mo, exp 87 Sr and exp 88 Sr, nuclei with 48, 49 or 50 MeV neutrons. Many previously unknown levels were found in both exp 90 Mo and exp 91 Mo, and the spin and parity of the low-lying states were determined. In exp 92 Mo and exp 88 Sr strongly excited states with excitation energies above 5 MeV were identified, and in the exp 88 Sr core multiplets of levels were found. The results of most of the experiments have been compared with model calculations. (Atomindex citation 10:420137)

INIS-mf-4686 PC **A08**/MF **A01**
Universidad Nacional Autonoma de Mexico, Mexico City. Facultad de Ciencias.
Unstable States Produced in Collisions among Complex Nuclei.
1978, 160p
In Spanish.Thesis.
U.S. Sales Only.

A theory about resonant elastic scattering is formulated and the wave function of unstable states associated with the resonances observed in the differential and total sections is studied. The object of this theory is to extend to the elastic collisions among complex nuclei, the methods and formalism of the scattering of particles without structure by an external potential, following an idea originally formulated by H. Feshbach. (Atomindex citation 10:447540)

INIS-mf-4901 PC **A07**/MF **A01**
Vrije Univ., Amsterdam (Netherlands).
High-Spin States in IN and SN Nuclei Studied with In-Beam Techniques.
A. van Poelgeest. 19 Oct 78, 138p
Proefschrift (Dr.).
U.S. Sales Only.

An experimental search for high-spin states of exp 109 In, exp 110 Sn, exp 116 Sn and exp 118 Sn, which can be described as core coupled states or collective bands is reported. The experimental equipment and techniques used and the formalism used to determine spins, parties and multipolarities are described. The results are presented and discussed. (Atomindex citation 10:451249)

INIS-mf-4987 PC **A03**/MF **A01**
Institutul de Fizica si Inginerie Nucleara, Bucharest (Romania).
Contribution to the Study of the Elastic Scattering of Photons on Nucleons at Low and Intermediate Energies.
Thesis (D.S.),
I. Guiasu. 1978, 36p
In Romanian.
U.S. Sales Only.

The elastic gamma -nucleon scattering represents an indirect powerful method for the nucleon structure investigation. Some theoretical aspects of this problem are treated in the presented thesis. After a general introduction into the subject and a short review of the up-to-date literature, the first chapter contains kinematics and dynamical preliminaries of reaction gamma +N implies gamma +N. In chapter II, the low energy theorems are discussed and extended up to six power in the photon laboratory energies, omega ; the six structure dependent constants which appear in the differential cross section in this order are defined and computed, and an extraction for the proton electromagnetic polarizabilities alpha , beta from the experimental data is performed. A new dispersive analysis of the gamma +N implies gamma +N process at photon laboratory energies lower than 450 Mev is introduced and used for numerical calculation in chapter III; some improvements are obtained in the comparison with the experimental data, with respect to other previous calculations. In the last chapter, two different sum rules for the difference (alpha - beta) are established and numerically computed - these theoretical predictions agree with the values extracted from experience; based on the analyticity properties of the invariant amplitudes, an inequality is written down connecting an

integral over the differential cross section of the process and the static properties ofthe nucleon (mass, charge, anomalous magnetic moment). (Atomindex citation 10:460179)

INIS-mf-5141 PC **A07**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet.
Special Hadronic Decay Channels of the J/PSI and PSI' Resonances.
H. G. Sander. 29 Nov 77, 126p
In German.Diss. (D.Sc.).
U.S. Sales Only.

The decay of the I/PSI and PSI' resonan-ces in final states with two charged particles and two photons have been studied. The branching ratios are calculated by normalization with respect of the number of mu exp + mu exp - -pairs from J/PSI decay and the PSI' implies X + (J/PSI implies mu exp + mu exp -) decay cascade respectively. In the case of J/PSI many decay channels have been observed, whereas for the PSI' decay in ordinary hadrons only upper limits can be given. From an analysis of the J/PSI implies mu exp + mu exp - mu exp 0 decay, which is dominated by the pi p channel, the iso spin of the J/PSI resonance is determined to I=0. By comparison of the branching ratios of different SU(3) states for the J/PSI decay in a pseudo scalar and a vector meson the J/PSI SU(3) singulett character is confirmed. Finally the study of the decays PSI' implies gamma gamma mu exp + mu exp - gives the branching ratio for PSI' implies n J/PSI and evidence for the Pc-states. (8.6+-3.4) Pc (3.51) events have been observed as well as 2 Pc (3.41) candidates and one event at Pc (3.45) and Pc (3.56) respectively. (Atomindex citation 10:472085)

INIS-mf-5333 PC **A08**/MF **A01**
Groningen Rijksuniversiteit (Netherlands).
Nuclei at High Angular Momentum, Investigated with a Mini-Orange Spectrometer.
S. J. Feenstra. 22 Jun 79, 175p
U.S. Sales Only.

The multipolarity of continuum transitions following the reactions exp 160 Gd(exp 4 He,4n) exp 160 Dy and exp 146 Nd(exp 20 Ne,4n or 5n) exp 162 exp 161 Yb has been deduced from experimental conversion coefficients. Conversion-electron spectra were measured with a Mini-Orange Spectrometer, while gamma -ray spectra were recorded simultaneously with a NaI(Tl) detector or, at low energies (0.5 MeV), with a Ge(Li) detector. Both the electron and gamma -ray spectra were measured in coincidence with discrete transitions in the product nuclei. The author derived the average conversion coefficient alpha sub(T) in three different energy regions. In the statistical region, above 1.5 MeV, the alpha sub(T) values are consistent with the multipolarity E1. In the yrast region, between 0.7 and 1.5 MeV, alpha sub(T) approaches to the value expected for E2 radiation. Special attention has been given to the low-energy part of the continuum around 0.5 MeV. Recently, it has been proposed that low-energy continuum radiation has M1 multipolarity. The results of the author's conversion coefficient measurement do not support this suggestion. Especially in this low-energy region the coincidence requirement between continuum transitions and discrete lines appeared to be important. Without this requirement, too high, misleading alpha sub(T) values, were obtained. (Atomindex citation 11:496102)

INIS-mf-5337 PC **A04**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Radiative Capture of Polarized Neutrons by Aluminium and Manganese Nuclei.
13 Jun 79, 60p
U.S. Sales Only.

This investigation treats the angular dependence of the intensity and of the circular polarization of gamma radiation that is emitted after capture of polarized neutrons by polarized and unpolarized targets. Interference effects between the (n, gamma)-reaction amplitudes with different channel spin are discussed and angular distribution coefficients are calculated in case mixing of dipole and quadrupole radiation occurs. It is indicated how the influence of p-wave capture may be taken into account. The nuclear orientation experiments on aluminium yield the values of the angular distribution coefficients of primary and secondary gamma-ray transitions, and by a chi exp 2 -analysis five spin values are assigned uniquely and several alpha -values are determined. The nuclear orientation experiments on manganese lead to alpha -values and unique spin assigments for thirteen nuclear states in exp 56 Mn. (Atomindex citation 11:496159)

INIS-mf-5417 PC **A08**/MF **A01**
Groningen Rijksuniversiteit (Netherlands).
Isoscalar Giant Quadrupole Resonance in SD-Shell Nuclei. An Experimental Study of Isoscalar Multipole Strength by Inelastic alpha Scattering at 120 MeV.
K. van der Borg. 10 Sep 79, 155p
Proefschrift (Dr.).
U.S. Sales Only.

This thesis describes the theory concerning DWBA and CCBA calculations and shows how the obtained deformation parameters can be converted into isoscalar transition rates and energy-weighted sum rule strength. It describes the experimental method used for measuring inelastically scattered alpha particles. In addition the way the spectra have been analyzed is described. It describes the experimental results and DWBA analysis of the angular distributions. In addition a coupled channel analysis is given for some strongly coupled states. (Atomindex citation 11:501594)

INIS-mf-5419 PC **A06**/MF **A01**
Amsterdam Univ. (Netherlands).
Antiproton-Proton Annihilations into Four Prongs at 7.2 GeV/C.
A. de Leeuw. 6 Jun 79, 110p
Proefshrift (Dr.).
U.S. Sales Only.

Annihilation reactions are described in which four charged pions and also maybe uncharged particles are produced. Data were acquired in an antiproton-proton experiment at a beam momentum of 7.2 GeV/c and 220K pictures of the CERN 2m HBC were measured. Cross sections have been determined and angular distributions of the pions and of some resonances are given. Two models that describe annihilation reactions are treated, the so called CLA model and a simple quark model. (Atomindex citation 11:501412)

INIS-mf-5434 PC **A08**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet.
Search for Resonances in the (AntiK exp 0 pi exp + pi exp -) System Generated in the Charge Exchange Reaction K exp - p Implies AntiK exp 0 pi exp + pi exp - N at 10 GeV/C.
E. Koenigs. 2 Feb 78, 152p
In German.Diss. (D.Sc.).
U.S. Sales Only.

The author has measured the differential cross sections for the reactions K exp - p implies anti K exp 0 pi exp + pi exp - n at 10 GeV/c and determined the differential cross sections for the production of K*(1420) and K*(1800) resonances using a partial wave analysis. (Atomindex citation 11:504190)

INIS-mf-5441 PC **A07**/MF **A01**
Mainz Univ. (Germany, F.R.). Fachbereich Physik.
Investigation of the Nucleon Structure and the Nucleon-Nucleon Interaction by Electron-Deuteron Scattering.
G. G. Simon. 1 Mar 78, 136p
In German.Diss. (D.Sc.).
U.S. Sales Only.

In this thesis results of measurements of the differential cross sections of the elastic and inelastic electron deuteron scattering are presented. The data were taken at several scattering angles and in the electron energy range of 150 MeV up to 320 MeV. The extracted form factors and structure functions are compared with theoretical results which are sensitive to details of nucleon structure and of the nucleon-nucleon forces. (Atomindex citation 11:504418)

INP-917/PL PC **A05**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Investigations of Collective and Single-Particle Aspects of Excitation in 1F/sub(7/2)/ Shell Nuclei.
J. Styczen. 1976, 82p
In Polish.
U.S. Sales Only.

Experimental data are presented which were obtained in spectroscopic studies on 1f/sub(7/2)/ shell nuclei in the following reactions: exp 30 Si(exp 16 O,pn) exp 44 Sc, exp 44 Ca(p,n) exp 44 Sc, exp 42 Ca(alpha ,p) exp 45 Sc, exp 42 Ca(alpha ,n) exp 45 Sc, exp 45 Sc(alpha ,pn) exp 47 Ti, exp 46 Ti(alpha ,p) exp 49 V, exp 47 Ti(alpha ,pn) exp 49 V, and exp 49 Ti(p,n) exp 49 V. Experimental reduced transition probabilities B(M1) and B(E2) have been systematically compared for in-band transitions of K/sup pi / = 3/2 exp + bands in exp 43 exp 45 exp 47 Sc, exp 45 Ti and exp 47 exp 49 V nuclei. In the framework of the pure rotational model, intrinsic quadrupole moments alpha Q sub 0 alpha and alpha g/sub K/-g/sub R/ alpha ratios have been derived. Band mixing calculations in a strong coupling model treating more correctly the j exp 2 term in the hamiltonian and hole excitations have been undertaken on properties of negative-parity states in the cross-conjugate nuclei exp 47 Ti- exp 49 V and V exp 47 - exp 49 Cr. There is an overall good agreement between the experimental data and the theoretical predictions. The strong coupling model has been also used to study possible regions of stable deformation for the positive-parity states of the odd nuclei in the 1f/sub 7/2/ shell. Band mixing calculations performed for these states have shown that the experimental data are well reproduced in the calculations with a deformation parameter corresponding to a minimum of the static potential energy. (Atomindex citation 10:428927)

INP-927/PL PC **A05**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Hyperfine Interactions in Ferromagnetic Materials and Magnetic Properties of 1F/sub 7/2/ Nuclei.
E. Bozek. 1976, 77p
In Polish.
U.S. Sales Only.

Hyperfine interactions of light nuclei recoil-implanted into iron, nickel, and cobalt were studied using the perturbed integral angular distribution IMPAD. Isomeric states of lifetimes within the nanosecond range were excited in the following reactions: exp 28 Si exp 14 N, xn, yp exp 37 Ar, exp 39 K, exp 40 K; exp 27 Al exp 16 O, xn, yp exp 41 K, exp 41 Ca. In all cases except implantation of potassium isotopes into nickel observed shifts of angular distribution were found much smaller than the ones calculated using the known values of g factors, lifetimes and strengths of the hyperfine fields. This effect can be explained under the assumption that only a fraction of nuclei feel the full magnetic field. Different fractions obtained for exp 40 K and exp 41 K suggest a migration process on a ns time scale. The magnetic moments of isomeric nuclear states excited in reaction exp 27 Al exp 14 N, p exp 36 Cl, exp 24 Mg exp 19 F, 2pn exp 40 K and exp 48 Ca(alpha ,2n) exp 50 Ti were measured using the perturbed integral angular distribution technique - IPAD in an external magnetic field. The g factors for the investigated states were interpreted on the base of the shell model, assuming the effective magnetic moments associated with shell model orbitals d/sub3/2/ and f/sub7/2/. (Atomindex citation 10:429027)

INP-928/PL PC **A05**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Investigation of Quadrupole Interactions in Single Crystals with the Perturbed Angular Correlation Method.
R. Kulessa. 1976, 82p
In Polish.
U.S. Sales Only.

Time-integral perturbed angular correlation measurements after Coulomb excitation for transitions from the first rotational levels in sup(152, 154)Sm, sup(182, 184, 186)W and sup(180, 190, 192)Os isotopes are presented. The Coulomb excitation process was used to implant the excited nuclei in Zn, Cd, Te and Gd single crystals of hexagonal

structure. A strong dependence of the angular correlation function on the single crystal orientation for all combinations of target and single crystals caused by electric quadrupole interaction has been confirmed. The quadrupole interaction frequency omega sub 0 values the quadrupole moments ratio for samarium, tungsten and osmium isotopes were determined. Using the quadrupole moments derived from B(E2) values, the effective electric field gradients acting on samarium, tungsten and osmium nuclei implanted into zinc, cadmium, tellurium and gadolinium single crystals have been evaluated. It has been confirmed that the electronic component of the electric field gradient has the main influence on the effective electric field gradient. Perturbed beta - gamma angular correlation for transition from the 81 keV level in exp 133 Cs, populated by the beta decay of exp 133 Xe implanted after the nuclear reaction into tellurium single crystals, is presented. The sign and the minimum value of the quadrupole moment for the 81 keV level in exp 133 Cs has been determined. (Atomindex citation 10:427981)

INP-929/PH PC **A02**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Interactions of Pions and Protons with Emulsion Nuclei at 60 GeV and 200 GeV.
J. Babecki, B. Furmanska, R. Holynski, A. Jurak, and G. Nowak. 1976, 17p
U.S. Sales Only.

Parameters describing the multiplicity distributions of shower particles and evaporation tracks as well as the correlation between them have been analyzed. The observed differences for pion and proton interactions at the same energy are consistent with the hypothesis that the relevant parameter which describes the production process is the mean free path of the incident particle inside the nucleus. (Atomindex citation 10:428471)

INP-940/PL PC **A02**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Antisymmetrization Effects and the Form-Factor of the Real Part of the alpha - Nucleus Interaction.
Z Majka, A. Budzanowski, K. Grotowski, and A. Strzalkowski. 1977, 15p
U.S. Sales Only.

Antisymmetrization effects in alpha -nucleus interaction are investigated on the basis of a microscopic model in a one nucleon exchange approximation. It influences the form-factor, increasing the half-way radius and decreasing the diffuseness as compared with the direct term of the potential only. Antisymmetrization preserves the shape of the potential which can be parametrized by a Woods-Saxon squared form. Phenomenological potential with the energy independent form-factor of the above shape fits experimental data in a wide energy region. (Atomindex citation 10:428856)

IPNO-PhN-77-24 PC **A04**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire.
Study of the Mechanism of the (Exp 3 He, alpha) Reaction at 210 MeV and Hole State Excitation in the Deep Sheils.
J. Van de Wiele, E. Gerlic, H. Langevin-Joliot, and G. Duhamel. 1977, 64p
In French.
U.S. Sales Only.

The (exp 3 He, alpha) reaction on exp 12 C, exp 16 O, exp 28 Si, exp 58 Ni, exp 90 Zr, exp 118 Sn, exp 124 Sn and exp 208 Pb target was studied at 217 MeV (or 205 MeV) in order to investigate the reaction mechanism at high energy and large momentum transfer. The reaction yields large cross sections at very forward angles and strongly enhances the largest orbital momentum transfers. The main mechanism is direct pick-up although two-step processes are quite important for some transitions. The choice of the optical potential is of critical importance to reproduce the shapes of pick-up angular distributions in the framework of the DWBA-ZR analysis. (Atomindex citation 09:410476)

IPNO-PhN-78-10 PC **A03**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire.
Heavy Ion Experiments of the MP Tandem at Orsay: Particle Correlation Studies and Mass Measurements on Exotic Nuclei.
P. Roussel. 1978, 27p CONF-780284-1
16. winter school, Bielsko-Biala, Poland, 20 Feb 1978.
U.S. Sales Only.

Two heavy-ion experiments are reported which both use a magnetic spectrometer. The equipment of the focal plane of the magnet is based on the use of a set of gas counters which are described. A method for the reconstitution of trajectories is given. The aim of the experiments is to reach a deeper knowledge of the reaction mechanism in the case of a heavy ion-induced alpha -transfer reaction. Correlation experiments are performed in order to measure the polarization of the residual nucleus. The other experiment is done in order to measure the mass excess of some light exotic nuclei and the excitation energy of their first excited state by relative Q-value measurements. (Atomindex citation 10:447648)

IPNO-TH-77-50 PC **A02**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire.
Giant Isovector Monopole Resonance and Coulomb Mixing in Nuclei.
N. Auerbach, and 1977, 7p CONF-7709117-2
Conference on electro and photoexcitation, Sendai, Japan, 12 Sep 1977.
U.S. Sales Only.

The isovector monopole state is calculated using the RPA and TDA and the Skyrme III interaction. Calculations are performed for the parent and analog nucleus. Isospin impurities in the parent ground state and Coulomb shifts as well as escape widths of the isobaric analog resonance are evaluated. (Atomindex citation 09:410199)

IPNO-TH-79-10 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Mesonic-Exchange Currents in the Photomesic Reactions.
C. Lazard, Z. Maric, and D. Zivanovic. Feb 79, 13p
U.S. Sales Only.

The gamma d implies pi exp 0 d reaction is analysed in the framework of the relativistic many-body theory with mesonic degrees of freedom explicitly present. It is shown that the mesonic correlations can be grouped into transition operators containing vertices of some elementary reactions between photon, nucleons and pions. The wave function corrections due to meson exchange currents are included in the transition operators, and the S-matrix is obtained with the nonrelativistic deuteron wave function. (Atomindex citation 11:501515)

IPNO-TH-79-13 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Self-Consistent Study of Deformation Properties of Even Cadmium Isotopes in the Vicinity of the N=50 Magic Number.
J. Letessier, P. Quentin, and M. Meyer. Mar 79, 22p
In French.
U.S. Sales Only.

Deformation energy curves of exp 98 Cd, exp 102 Cd, exp 196 Cd, exp 110 Cd isotopes have been performed using the Skyrme SIII effective interaction. With the exception of the neutron magic exp 98 Cd isotope, these nuclei are found -in the purely static calculations- to be soft, prolate shaped and moderately deformed at equilibrium. (Atomindex citation 11:501516)

IPNO-TH-79-9 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Predictions of Parity-Non-Conserving Effects in Nucleon-Deuteron Scattering.
B. Desplanques, J. J. Benayoun, and C. Gignoux. Feb 79, 25p
U.S. Sales Only.

Parity-non-conserving effects in nucleon-deuteron scattering are calculated in the Faddeev approach for realistic models of the nucleon-nucleon strong interaction and various components of the weak nucleon-nucleon interaction. The results are somewhat larger than expected on the basis of previous estimates. If present calculations of parity-non-conserving effects in nuclei are reliable, they indicate that an asymmetry of about -0.8x10 exp -7 should be measured in the total proton-deuteron cross-section for longitudinally polarized protons. (Atomindex citation 11:501466)

ISN-78-01 MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
1977 Annual Report.
144p
In French.
U.S. Sales Only. Microfiche copies only.

This report of the Nuclear Sciences Institute of Grenoble gives a general survey of the scientific and technical activities in 1977. The post-accelerator program SARA is described. In nuclear experimental physics, the research areas are heavy ion nuclear reactions, nuclear structure, nuclear spectroscopy; in collaboration with other laboratories pion scattering experiments and p invariance confirmation were studied. In theoretical physics, reaction processes, three-body problem, nuclear structure and high-energy pion collisions have been studied. (Atomindex citation 11:497551)

ITEF-114(1977) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Determination of the Total Cross Section of f-Meson-Nucleon Interaction at 3.2 GeV/C.
V. V. Barmin, V. G. Barylov, and B. S. Volkov. 1977, 12p
In Russian.
U.S. Sales Only.

The paper is devoted to determining the total cross section of interaction of f-mesons with nucleons on the basis of analysis of incoherent production of f-mesons on a xenon nucleus followed by the f implies 2 pi exp 0 decay. The f meson production by pi exp - mesons at 3.2 GeV/c was studied. From the total number of events with two pi exp 0 mesons the cases of the f mesons production on individual nucleons of a nucleus are discriminated, i.e., the number of the pi exp - +(p) implies n+f(f implies 2 pi exp 0) reactions is determined. The total cross section of f meson interaction with nucleons is equal to (42.5+-9) mbarn. (Atomindex citation 09:413358)

ITEP-11(1979) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Masses of Light Hadrons in the Bag Model.
I. Yu Kobzarev, B. V. Martemianov, and M. G. Schepkin. 1979, 17p
U.S. Sales Only.

The masses of the light hadrons p, lambda , sigma , xi , delta , sigma *, xi *, pi , kappa, rho, kappa*, phi omega are calculated in the bag model. The basic parameter of the model, B, defining the energy of the bag creation, E=BxV, V being the volume of the bag, is assumed to be different for mesons and baryons. A consistent method for taking into account the interaction of quarks in the bag is suggested. This method is based on standard quantum mechanical perturbation theory for the emission and absorption of gluons by quarks. The corrections to the particle masses are calculated in the first and second approximation in quark-gluon coupling. (Atomindex citation 11:504061)

ITEP-159(1978) PC **A04**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Quasinuclear Baryonium and Annihilation.
B. O. Kerbikov, and I. S. Shapiro. 1978, 56p
U.S. Sales Only.

The properties of the quasinuclear baryonium are considered in the framework of the dynamical coupled channel model. The main principles of the model are reviewed. The energy spectrum of the N

anti N system and the problem of the baryonium radius are discussed. A detailed investigation of the problem of baryonium annihilation width and the low-energy N anti N annihilation cross section is presented. (Atomindex citation 11:501504)

ITEP-16(1976) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Quasinuclear Mesons with Masses Near 2 GeV and Charge Exchange Anti Pp Implies Anti Nn Reaction.
L. N. Bogdanova, O. D. Dalkarov, B. O. Kerbikov, and I. S. Shapiro. 1976, 12p
U.S. Sales Only.

It is shown that available experimental data do not contradict the hypothesis on the existence of two quasinuclear mesons with masses 2020 and 1932 Mev, isospins-G-parities (Isup(G)) 0 exp + and 1 exp -, and coinciding spins-P- parities. Experimental effects to follow from this assumption are discussed. (Atomindex citation 10:435446)

ITEP-176(1978) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Sum Rules for UPSILON Family Formation in the E exp + E exp - Annihilation.
M. B. Voloshin. 1978, 22p
U.S. Sales Only.

Theoretical investigation of exp - resonance production in the e exp + e exp - annihilation is presented. For this purpose vacuum polarization by vector (electromagnetic) current of b quarks is considered. The calculation of the amplitude of the process leads to the sum rules for exp - resonance production. The L-transform of the vacuum polarization amplitudes is discussed. It is shown that agreement of theoretical prediction with experimental data is fulfilled for the b quark mass m=4.65+-0.05 GeV. It is evident for reality of gluon exchange at short distances. (Atomindex citation 11:501387)

ITEP-33(1979) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Electromagnetic Properties of Hadrons in the Bag Model.
I. Yu. Kobzarev, B. V. Martemjanov, and M. G. Schepkin. 1979, 12p
U.S. Sales Only.

The widths of V implies P gamma decays, where V and P are vector and pseudoscalar mesons, respectively, magnetic moments of baryons and axial constants of beta decays are calculated in the bag model. One-gluon corrections are taken into account in the wave functions of hadrons. (Atomindex citation 11:501349)

ITEP-35(1979) MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Parametrization of the CP Violation in the SU(2)XU(1) Model of the Weak Interaction with n-Quark Doublets.
B. V. Martemianov. 1979, 7p
U.S. Sales Only. Microfiche copies only.

The problem about parametrization of the CP violation is investigated in general form in the SU(2)xU(1) model of the weak interaction with n-doublets of quarks. The recurrent method of parametrization of unitary charged-current mixing matrix containing CP-nonconserving phases is carried out. It is also shown that this method of unitary matrix construction gives the exhausting parametrization in the sense that it is always possible to reproduce any given the Kobayashi-Maskawa matrix U/sub km/(n) by choosing the set of parameters in a proper way. (Atomindex citation 11:501357)

ITEP-43(1978) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Charged Current Neutrino Interactions Below 30 GeV.
A. E. Astratyan, V. Sh. Epstein, and A. P. Bugorsky. 1978, 12p
U.S. Sales Only.

Charged current data from a spark chamber neutrino experiment at the 70 GeV Serpukhov accelerator (10200 events in nu beam and 3600 events in anti nu beam with energies up to 30 GeV) have been analyzed. Total neutrino and antineutrino cross sections and v-distributions are obtained. (Atomindex citation 11:501402)

ITEP-7(1979) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Nearthreshold Phenomena in N Anti N System as a Coupled Channel Problem.
L. N. Bogdanova, V. E. Markushin, and I. S. Shapiro. 1979, 36p
U.S. Sales Only.

The properties of the quasinuclear baryonium are considered in the framework of a dynamical coupled channel model. The stability of the potential approach predictions with respect to both the annihilation influence and the t - channel interaction variations is investigated. (Atomindex citation 11:501456)

ITF-77-72-R PC **A03**/MF **A01**
AN Ukrainskoj SSR, Kiev. Inst. Teoreticheskoj Fiziki.
Double-Logarithmic Asymptotics of Two-Particle Processes in Quantum Electrodynamics. Functional Approach.
Yu. P. Peresun'ko. 1977, 30p
In Russian.
U.S. Sales Only.

Two fermion scattering amplitudes are considered in functional formulation of quantum electrodynamics. While evaluating the arising functional integrals it is supposed that only the class of potentials on which the integrand has singularities makes contribution. The integral equations are obtained which are satisfied by the amplitudes. The principal (double logarithmic) asymptotics of solutions of these equations are obtained. The obtained asymptotics of the solutions of these equations are obtained. The obtained asymptotics of the solutions coinside with the expressions for the amplitudes of the appropriate processes found by V.N. Gribov et al using the asymptotic diagram summation of the perturbation theory. (Atomindex citation 09:392712)

ITF-77-85-R PC **A04**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Investigation of the Four-Nucleon System with Separable Nucleon-Nucleon Potentials.
V. F. Kharchenko, and V. P. Levashev. 1977, 60p
In Russian.
U.S. Sales Only.

On the basis of the integral equations of motion obtained earlier, the four-nucleon problem is considered with separable pair interactions of different form. With the application of the separable approximation for the scattering amplitude in subsystems, the energies of the ground and first excited states of the four-nucleon system and the nucleon-trinucleon scattering lengths have been calculated. Some correlations between binding energies of three and four nucleons have been found. The obtained results are compared with experimental data. (Atomindex citation 10:431938)

ITF-77-91-R PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Three-Particle Scattering Theory.
V. E. Kuz'michev. 1977, 7p
In Russian.
U.S. Sales Only.

The approach proposed earlier by the author to three-particle scattering theory is discussed. This approach may prove to be useful for studying certain problems in the physics of few-nucleon systems. The corresponding equations for the partial components of the amplitudes and the potentials are obtained in the N-d scattering case. (Atomindex citation 10:431948)

Juel-1520 PC **A03**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik.
Differential Cross Sections for Proton Scattering on exp 24 Mg Measured Between 22.5 and 28.0 MeV.
C. Mayer-Boericke, I. Lovas, M. Rogge, U. Schwinn, and P. Turek. Jun 78, 40p
U.S. Sales Only.

This report contains the differential cross sections for elastic and inelastic scattering of protons on exp 24 Mg measured in the incident proton energy range from 22.5 to 28.0 MeV. (orig.) 891 WL. (Atomindex citation 10:429138)

JINR-E-1-10831 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Proton Spectra from 6.3 GeV/C Deuteron Break-Up on H, D, C, Al and Bi Nuclei.
L. S. Azhgirey, M. A. Ignatenko, V. V. Ivanov, A. S. Kuznetsov, and M. G. Meshcheryakov. 1977, 14p
U.S. Sales Only.

The proton spectra from deuteron break-up on H, D, exp 12 C, exp 27 Al and exp 209 Bi nuclei were measured at an angle of 103 mrad (lab. system) in the momentum interval from 2.6 to 3.6 GeV/c. The measurements were made at the JINR synchrophasotron by one-arm magnetic spectrometer online with a computer. The extracted 6.3 GeV/c deuteron beam was incident on targets of CH sub 2, CD sub 2, C, Al and Bi at the thickness from 0.8 to 2 g/cm exp 2. The flux of deuteron beam was equal to 5x10 exp 8 -5x10 exp 9 particles/pulse with a typical pulse length of 300 ms. The repetition rate was one pulse every 10 s. Proton peaks with the maximum at about 3.1 GeV/c and 280-300 MeV/c FWHM dominate in all the measured spectra. Experimental proton spectra are compared with calculations with the Reid, the Moravcsik Gartenhaus, the Hulthen and the Gauss wave functions. The results, on the whole, are reasonably reproduced in the framework of the Glauber multiple scattering model taking into account the relativistic deformation of the deuteron wave function. (Atomindex citation 10:428993)

JINR-E-1-11354 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Observation of the Direct exp 12 C(p, 3P) Reaction at an Energy of 640 MeV.
V. I. Komarov, G. E. Kosarev, H. Muller, D. Hetzband, and T. Stiehler. 1978, 10p
U.S. Sales Only.

The mass spectrum of backward emitted particles has been measured in the quasifree knock-out of a proton pair emitted forward from carbon nuclei at an incident proton energy of 640 MeV by the scintillation spectrometry method. As the experiment shows, the earlier investigated differential cross section for the forward knock-out of two fast protons and the simultaneous backward emission of a light particle can be attributed to the direct reaction of (p,3p) type. The dependence of the counting rate of triple coincidences on the angle between the forward knocked out protons indicates a broad distribution of relative momenta within the proton pair. (Atomindex citation 09:406749)

JINR-E-1-11564 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Observation of Correlation Between Two Fast Protons in Proton-Nucleus Interactions at 640 MeV.
V. I. Komarov, G. E. Kosarev, H. Muller, D. Netzband, and T. Stiehler. 1978, 10p
U.S. Sales Only.

The measurements have been performed to observe correlations between backward emitted protons (BEP) and forward outgoing protons from quasi-free scattering of the incident proton of 640 MeV on a nucleon pair (pN) within Be, C, Al, Cu and Pb nuclei at the angles 12 deg and 122 deg: p sub 0 + pN implies p sub 1 + N + p sub 3. Here p

sub 1 is a proton detected in coincidence with BEP p sub 3 and N is a nucleon unobserved under the conditions of this experiment. The differential cross sections for the BEP of energies from 50 to 145 MeV have been measured in coincidence with forward outgoing protons (255 to 330 MeV) by scintillation counter method. The inclusive BEP spectra have been explained by the quasi-elastic backscattering on clusters which do not break up during the interaction. The calculated distributions are remarkably narrower than the experimental ones. The measurements point out that the discussed production of two fast protons is observable with all the targets and the cross section per target nucleon decreases with increasing the target mass number. (Atomindex citation 10:451226)

JINR-E-1-9878 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Investigation of p, pi exp +- Charged Particle Correlations in pi exp - C Interactions at 5 GeV/C with Emission of a Particle in the Backward Direction.
Yu. A. Budagov, A. A. Bayaramov, V. P. Dzhelepov, A. M. Dvornik, and A. V. Efremov. 1976, 7p
U.S. Sales Only.

The pi -C interactions at 5 GeV/c are studied. Angle correlation between two charged particles when a particle is emitted to the backward hemisphere has been investigated. Noticeable correlation appears if the angle between the two particles is 180 deg (lab.s.). It follows from this behaviour that the backward emission of a particle is due to the hard collision mechanism. (Atomindex citation 09:416417)

JINR-E-17-11822 PC **A04**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Kinetic Equations for the Electron-Phonon Systems.
N. N. Bogolyubov. 1978, 70p
U.S. Sales Only.

The interaction of the electron with the phonon field and with the external electric field is considered. The exact equalities which by applying a suitable approximation procedure can be transformed for the electron-phonon system are derived. (Atomindex citation 10:427633)

JINR-E-2-10020 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Dynamical Breakdown of Chiral Symmetry and Abnormal Perturbation Expansion.
D. Ebert, and V. N. Pervushin. 1976, 18p
U.S. Sales Only.

Dynamical breakdown of gamma sub 5 -symmetry is studied in the Abelian gauge theory of massless "quarks" interacting with massless vector "gluons". For this purpose the path-integral approach with bilocal fields as dynamical variables is used. The classical field equation defined by the stationary point of the generating functional turns out to be identical with the Schwinger-Dyson equation for the quark propagator. After a short discussion of the possible solutions of this equation an abnormal perturbation theory has been worked out. (Atomindex citation 09:406170)

JINR-E-2-10125 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Dynamics of Relativistic Point Particles as a Problem with Constraints.
I. T. Todorov. 1976, 26p
U.S. Sales Only.

The relativistic n-particle dynamics is studied as a problem with constraints of the type (2phisub(i)=)msub(i)sup(2)-psub(i)sup(2)+PHIsub(i)=0, i=1,...,n, (C) where PHIsub(i) are Poincare invariant functions of the particles' coordinates, momenta and spin components; PHIsib(i) is assumed to vanish asymptotically when the i-th particle coordinates tend to infinity. In the two particle case it is assumed in addition that the Poisson bracket (phi sub 1 , phi sub 2) vanishes on the surface (C). That allows us to give a formulation of the theory, invariant with respect to the choice of the time-parameter on each trajectory. The quantization of the relative two-particle motion is also discussed. It is pointed out that the stationary Schrodinger equation obtained in this manner is a local quasipotential equation. (Atomindex citation 09:415236)

JINR-E-2-10774 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Description of the Decay nu Implies pi exp + pi exp - gamma in Quantum Chiral Field Theory.
M. K. Volkov. 1977, 12p
U.S. Sales Only.

The decay nu implies pi exp + pi exp - gamma is described in chiral field theory using the one-loop approximation. The absolute values of decay amplitude and width are calculated. The result is in satisfactory agreement with experimental data. (Atomindex citation 09:406255)

JINR-E-2-11581 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Power Falloff Behaviour of the High Psub(T) Inclusive Cross Sections.
N. S. Amaglobeli, L. A. Slepchenko, Yu. V. Tevzadze, A. N. Kvinikhidze, and V. A. Matveev. 1978, 23p CONF-780826-35
19. conference on high energy physics, Tokyo, Japan, 23 Aug 1978.
U.S. Sales Only.

Power behaviour p/sub T//sup -N/ 1-x/sub T//sup M/ of single particle inclusive spectra at large transverse momentum is analyzed on the basis of the recent world experimental data. The results obtained demonstrate the dependence of fitted parameters N and M on the range of variables p/sub T/, x/sub T/ and THETA. (Atomindex citation 10:447256)

JINR-E-2-11886 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Supersymmetric Form of the Thirring Model.
B. L. Aneva, and D. T. Stoyanov. 1978, 14p
U.S. Sales Only.

A super Thirring equation is proposed and studied. A solution of the renormalized Thirring model is constructed from two scalar massless superfields. The representations of the superconformal algebra for the scalar superfields are obtained. It is shown that the renormalized Thirring equation is covariant with respect to these representations. (Atomindex citation 10:474411)

JINR-E-2-11929 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Lie-Superalgebraical Aspects of Quantum Statistics.
T. D. Palev. 1978, 16p
U.S. Sales Only.

The Lie-superalgebraical properties of the ordinary quantum statistics are discussed with the aim of possible generalization in quantum theory and in theoretical physics. It is indicated that the algebra generated by n pairs of Fermi or para-Fermi operators is isomorphic to the classical simple Lie algebra B/sub n/ of the SO(2n+1) orthogonal group, whereas n pairs of Bose or para-Bose operators generate the simple orthosympletic superalgebra B(O,n). The transition to infinite number of creation and annihilation operators (n implies infinity) does not change a superalgebraic structure. Hence, ordinary Bose and Fermi quantization can be considered as quantization over definite irreducible representations of two simple Lie superalgebras. The idea is given of how one can introduce creation and annihilation operators that satisfy the second quantization postulates and generate other simple Lie superalgebras. (Atomindex citation 10:463916)

JINR-E-2-12288 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Antishadowing Phenomenon in the Hadron Inelastic Diffraction on Nuclei.
B. Z. Kopeliovich, L. I. Lapidus, S. V. Mukhin, and A. B. Zamolodchikov. 1979, 18p
U.S. Sales Only.

Inelastic diffraction scattering on nuclei is treated in the eigenstate method (ESM), correctly describing the space-time picture of the interaction. It is shown that ESM is equivalent to the multiple scattering model (MSM) which takes into account all possible intermediate states. In the quark-parton version of ESM it was found that the inelastic diffractive amplitude has the opposite sign to the elastic one. This leads to the abnormal sign of some terms in MSM-antishadowing phenomenon. The data on the pd implies xd reaction clearly confirm this conclusion. The ignoring for the antishadowing corrections is a reason of the diminishing values of the absorption cross sections obtained for hadrons diffractively produced in nuclei. (Atomindex citation 11:501510)

JINR-E-2-9529 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Mechanism of Hadron Cumulative Production on Nuclei.
A. V. Efremov. 1976, 9p
U.S. Sales Only.

A mechanism of cumulative production of hadrons on nuclei is proposed which is similar to that of high transverse hadron production. The cross section obtained describes the main qualitative features of such processes, e.g., initial energy dependence atomic number behavior, dependence on the rest mass of the produced particle and its production angle. (Atomindex citation 10:428496)

JINR-E-4-11311 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Evolutions within Angular Distributions of Deep Inelastic Collisions.
R. Schmidt, and V. D. Toneev. 1978, 19p
U.S. Sales Only.

A dynamic model including the deformation degree of freedom is developed to describe the angular distribution of the deep inelastic collisions products. The dependence of the shape of the angular distribution on the mass number and the bombarding energy of the ions as well as on the kinetic energy of the reaction products is discussed. The model allows one to systematize the angular characteristics of deep inelastic collisions within the evolution diagram. (Atomindex citation 09:406831)

JINR-E-4-12284 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Kinetic Energy Dissipation in Heavy-Ion Collisions.
S. I. Fedotov, R. V. Jolos, and V. G. Kartavenko. 1979, 14p
U.S. Sales Only.

Kinetic energy dissipation mechanism is considered in deep inelastic heavy-ion collisions. It is shown that the significant part of the kinetic energy loss can be explained by the excitation of the nuclear matter multipole vibrations. The main contribution of the energy dissipation is given by the time-dependent heavy-ion interaction potential renormalized due to the nuclear excitations, rather than by the velocity-proportional frictional forces. (Atomindex citation 11:501474)

JINR-E-4-12394 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Three-Body Molecular Description of exp 9 Be. Pt. 2. Adiabatic One-Level Approximation with Correct Angular Momentum.
J. Revai, and A. V. Matveenko. 1979, 24p
U.S. Sales Only.

The low-lying spectrum of the exp 9 Be nucleus is calculated in the alpha + alpha +n three-body model. The molecular approach to this three-body problem based on the exact evalution of the two-center wave functions for separable n- alpha potentials is considered in detail. The numerical results are obtained in the generalized Born-Oppenheimer approximation which preserves total angular momentum and parity. (Atomindex citation 11:501537)

JINR-E-4-9758 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).

Giant Quadrupole Resonances in Odd-A Deformed Nuclei.
S. V. Akulinichev, and L. A. Malov. 1976, 7p
U.S. Sales Only.

Within the framework of the semimicroscopic model a method is proposed for the description of electromagnetic transitions in a large energy range for odd-A deformed nuclei. The proposed calculation procedure of the strength function is convenient for studying both the giant resonance and the electromagnetic transitions around the neutron binding energy. The experimental research of the transitions in this energy range can be realized, for instance, through (n, gamma) reactions. Calculation results are given for exp 165 Ho and exp 155 Gd. One and the same calculation produces the transition probabilities for individual states at low energies and the transition probabilities for groups of states with definite Ksup(pi) at intermediate and high energies. (Atomindex citation 09:410193)

JINR-R-1-10977 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Angular and Energy Spectra of Protons, Emitted in pi Xe Interactions at 2.34 and 3 5 GeV/C.
L. S. Okhrimenko, Ya. Plyuta, V. Pehryt, B. Slovinskii, and Z. Strugal'skii. 1977, 12p
In Russian.
U.S. Sales Only.

The angular and energy distributions of protons emitted in the pi exp +- + Xe implies kp + ... interactions are analyzed at 2.34 and 3.5 GeV/c, k being equal to from 1 to 14. The multiplicity distributions for the secondary charged particle emission have also been investigated. The experimental results have been obtained by means of xenon bubble chambers. The results are compared with the results calculated according to the cascade-evaporational model (CEM). Analysis has shown that the CEM histograms do approximate the experimental angular and energy distributions with a probability of not less than 50%. It is noted that it is the first time the CEM is subjected to such an all-out checking. (Atomindex citation 10:429148)

JINR-R-1-11401 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Maltinucleon Interactions of pi exp - Mesons with Carbon Nuclei at p = 40 GeV/C.
N. S. Angelov, V. G. Grishin, T. Kanarek, Yu. Nad, and S. Batskovich. 1978, 15p
In Russian.
U.S. Sales Only.

Multinucleon interactions between pi exp - mesons and exp 12 C nuclei were investigated. Experiments were carried out by means of 2m propan chamber exposed to pi exp - mesons at p=40 GeV/c. Experimental results are satisfactorily described in the framework of the multiple scattering model. With account of extra protons escaping from nuclei, the agreement with the experiment is improved. (Atomindex citation 11:501397)

JINR-R-1-11951 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Analysis of the pi exp -12 C and pi exp - p Interactions with Hadron Emission to the Back Hemisphere in the Laboratory System at P sub 0 = 40 GeV/C.
A. I. Anoshin, M. K. Suleimanov, N. Angelov, V. G. Grishin, and V. B. Lyubimov. 1978, 15p
In Russian.
U.S. Sales Only.

pi exp -12 C, pi exp - p interactions taken in the 2 m propane chamber which are accompanied with the emission of charged particles to the back hemisphere in the laboratory system were studied at P/ sub pi / exp - = 40 GeV/c. The probability for such event realization was determined. Average characteristics of various particles in these interactions, and angular and momentum distributions of pi exp +- -mesons emitted to the back hemisphere were obtained. (Atomindex citation 11:501398)

JINR-R-1-12126 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.

Observation of a Peculiarity in the Effective Mass Distributions of p pi exp + pi exp + (N pi exp - pi exp -) Combinations in the Np Implies p pi exp + pi exp + pi exp - pi exp - N Reaction at P/sub n/ = (5.10 + -0.17) GeV/C.
A. Abdivaliev, K. Beshliu, and A. P. Gasparyan. 1979, 12p
In Russian.
U.S. Sales Only.

In the np implies p pi exp + pi exp + pi exp - pi exp - n reaction at 5.10+-0.17 GeV/c an anomaly in the distributions of effective masses of p pi exp + pi exp + (n pi exp - pi exp -) combinations at M=1440 MeV/c exp 2 has been observed. A possible resonance has an isotopic spin I=5/2, width GITA sub 0 approximately equal to 43 MeV/c exp 2 , and decays in approximately 90 percent of the cases to delte exp ++ pi exp + . Its spin is less than 1/2. The resonance production cross section is (21+-3) mu b. A good agreement of obtained characteristics with predictions on the basis of superconvergent sum rules for scattering or reggeons on particles is shown. (Atomindex citation 11:501394)

JINR-R-1-12145 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Investigation of Pp Correlations in pi C Interactions at 5 GeV/C.
A. B. Abdinov, A. A. Bairamov, and A. T. Abrosimov. 1979, 10p
In Russian.
U.S. Sales Only.

Proton-proton correlations over the difference of momenta and distributions over effective masses of two protons in the pi exp - C implies pp + ... reaction at 5 GeV/c were investigated on the basis of processing photographs from the one-meter propane chamber. Within the experimental accuracy limits, there were no dibaryon states discovered. Effective mass spectrum of two protons was smooth. The data on pp correlations confirm qualitatively the calculations performed by S.E. Koonin. (Atomindex citation 11:501393)

JINR-R-2-11148 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Virial Inequalities.
Ya. P. Terletskii. 1977, 6p
In Russian.
U.S. Sales Only.

The generalization of virial theorem is considered. A case is investigated when a potential energy is a sum of uniform functions of different orders. Virial inequalities are derived by methods of statistical physics. For interacting forces of gravitational (or Coulomb's) and short-range forces of repulsion the equilibrium temperature cannot overcome the virial one. (Atomindex citation 09:392729)

JINR-R-2-11300 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Coulomb Splitting of Relativistic C Ions into Three alpha -Particles.
1978, 13p
In Russian.
U.S. Sales Only.

Coulomb splitting of relativistic C ions to three alpha -particles has been considered. The basis of the mechanism is an assumption that the splitting takes place with preliminary excitation of carbon that is followed by its decay to three alpha -particles. The total cross sections of the gamma + exp 12 C implies 3 alpha and exp 12 C+ exp 208 Pb implies 3 alpha + exp 208 Pb reactions have been calculated as well as energy distributions of secondary alpha -particles. (Atomindex citation 09:413463)

JINR-R-2-11453 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Diffractive "Semioptical" Model of Fast Ion Interaction with Nuclei.
V. S. Barashenkov, and Z. Z. Musul'manbekov. 1978, 7p
In Russian.
U.S. Sales Only.

The Glauber diffraction theory for nucleus-nucleus interaction has been considered in the approach where one nucleus as a whole interacts with nucleons of the other nucleus. Since this approach is intermediate between the accurate Glauber theory and the optical limit, the calculations are essentially simplified. Cross sections calculated in "semioptical approximation" and determined experimentally are compared for 18 GeV/c alpha -particles with C, O, Al, Cu, Ag, Pb nuclei. The oscillation model density was used for target-nuclei with mass number of A<= 16. The Woods-Saxon density with parameters taken from the experiments on electron scattering and photoproduction was used for heavier nuclei. The "semioptical approximation" calculation is in better agreement with experiment than the optical approximation. (Atomindex citation 11:501445)

JINR-R-2-11511 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Study on the Structure of exp 16 O Resonance States on the Base of Products of Reactions with pi exp - and mu exp -.
M. Gmitro, R. A. Sakaev, L. A. Tosunyan, and R. A. Ehramzhyan. 1978, 13p
In Russian.
U.S. Sales Only.

The structure of total and partial spectra of neutrons from the decay of giant resonance states excited in the exp 16 O(pi exp - , gamma) and exp 16 O(mu exp - , nu sub(mu) processes is discussed. It is shown that the resonance structure of neutron spectrum is due to the decay of nuclear system collective states which form the giant resonance. The results obtained are in good agreement with experimental data. (Atomindex citation 10:420056)

JINR-R-2-11648 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Multiple Particle Production in Hadron-Nucleus Interactions at Extremely High Energies.
V. S. Barashenkov, and B. F. Kostenko. 1978, 8p
In Russian.
U.S. Sales Only.

An intranuclear cascade with provision for pre-equilibrium processes and evaporation of a residual excited nucleus in the energy ranges of an incident particle T=10-100 GeV has been calculated. The calculations were based on a cascade-evaporation model with trailing. Modelling of intranuclear N-N and pi -N interactions has been used. Calculated and experimental data have been compared. In spite of a number of quantitative differences between the experiment and the theory, there are no grounds for asserting about injustice of the intranuclear cascade mechanism, at least, up to energy of several hundred GeV. (Atomindex citation 11:501446)

JINR-R-2-11657 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Infinite Series of Conservation Laws for the Relativistic String in Three-Dimensional Space-Time.
A. M. Chervyakov. 1978, 8p
In Russian.
U.S. Sales Only.

The relativistic string in three-dimensional space-time, considered within the geomerical approach, is described by the nonlinear Liouville equation, for which an infinite sequence of local conserved currents has been obtained. The presence of infinite series of conservation laws points to the existence of latent symmetry of the considered equation. The Backlund transformation has been obtained that connects two different solutions of Liouville's equation and allows one to investigate its group structure. (Atomindex citation 10:427643)

JINR-R-2-11789 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Is the Cascade Mechanism of Nuclear Interactions Realized in the High Energy Region.
V. S. Barashenkov, and B. F. Kostenko. 1978, 21p
In Russian.

U.S. Sales Only.

Experimental data on inelastic meson and nucleon interactions with nuclei have been analyzed within the framework of internuclear cascades to separate out the points where the model is at variance with experiment and requires further improvement. It is possible to state that, at least up to 100 GeV energy, at present there is no sufficient basis to postulate some essentially new internuclear interactions, although taking into account the increased volume and accuracy of experimental data require programs of cascade calculations to be more precise and pay greater attention to detail. In particular, already at 10 GeV for a good agreement with experiment it is necessary to take into account the processes with which some cascade particles interact at once with an internuclear nucleon. In the region of energies of a hundred GeV without considering such processes it is possible to obtain agreement with experiment only semiquantitatively, with an accuracy up to a factor of 1.5-2 for the principal properties. (Atomindex citation 11:501444)

JINR-R-2-11991 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Effect of Gauge Invariance and Fermi Motion of Nucleons on Radiative Pion Capture by exp 16 O.
M. Gmitro, G. Ya. Korenman, V. P. Popov, R. A. Sakaev, and L. A. Tosunyan. 1978, 14p
In Russian.
U.S. Sales Only.

Partial transition rates and the gamma -quanta spectrum have been calculated for the exp 16 O(pi exp - , gamma) exp 16 N reaction using a new effective Hamiltonian. The Hamiltonian satisfies the requirements of gauge invariance and also encomposses the nucleonic Fermi-motion effects in a nucleus. According to the estimates the total gamma -quanta yield conforming to the nuclear spin-dipole excitations decreases by 10-15% and the gamma -quanta yield conforming to the spin-quadrupole branch of excitation decreases by 30%. The main differences from the results obtained with the traditional form of the effective Hamiltonian are fully related to a new kinematical factor, but the nucleon velocity terms and the effective Hamiltonian constant renormalization play an important part in weak transitions. (Atomindex citation 11:501482)

JINR-R-2-12010 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Wave Equation for Deuteron.
A. B. Pestov. 1978, 6p
In Russian.
U.S. Sales Only.

Relativistic equations of motion of deuteron in a given external field are proposed. Their nonrelativistic approximation is indicated. The deuteron energy levels in a stationary homogeneous magnetic field are determined. (Atomindex citation 10:467111)

JINR-R-2-12157 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Interference Correlations in Detection Neutral Kaon Pairs.
V. L. Lyuboshits, and M. I. Podgoretskii. 1979, 15p
In Russian.
U.S. Sales Only.

The interference phenomena in detection of neutral K-meson pairs with small relative momenta are investigated. It is shown that the nature of interference correlations in the production of the K exp 0 anti K exp 0 system is determined by the distance between K exp 0 and anti K exp 0 -meson emission points. In so doing the behavior of structure functions is significantly dependent on superpositions which are separated by detectors. It is shown that the probability of two K/sub s/ exp 0 meson choice contains the Bose statistics effect, independently of conditions of the K exp 0 anti K exp 0 -system production. This effect is similar to the corresponding one for identical pi -mesons. Explicit expressions are obtained describing the dependence of structure functions on momentum difference in the frame of the statistical model and in the case of neutral K meson production together with K* or anti K* resonances. (Atomindex citation 11:501356)

JINR-R-2-12190 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Production of Fast Hypernuclei During the Interaction of Relativistic Ions with Nuclei.
L. P. Kaptar, and A. I. Titov. 1979, 6p
In Russian.
U.S. Sales Only.

The calculation of the production cross section of hypernuclei during the interaction of high-energy heavy ions is presented. The calculated cross sections point to the possibility of production of hypernuclei and investigation of their main characteristics in fast streamer chambers. (Atomindex citation 11:501503)

JINR-R-2-12208 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Mechanism of the Backward Emission of Fast Protons in Hadron-Nucleus Interactions at Intermediate and High Energies.
V. I. Komarov, and D. Myuller. 1979, 8p
In Russian.
U.S. Sales Only.

Inclusive emission of protons from the reaction h+A implies p/Q/sub p/ > 90 deg, T/sub p/ > 30 MeV/ + anything is investigated. A model describing the fast proton emission in the back hemisphere in hadron-nucleus interactions is considered. Representations about anomalously high momenta or nucleon densities in the ground state of the target-nucleus are not used in the model. In the framework of the model the proton emission results from the decay of few-nucleon groups of the target-nucleus highly excited in the quasi-diffraction hadron scattering from these groups. A hypothesis of universality of the few-nucleon group excitation function for excitations of the order of the pion mass and higher is considered. (Atomindex citation 11:501509)

JINR-R-2-12267 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Asymptotic Space in the G-PSIPSIPHI.
N. A. Sveshnikov. 1979, 20p
In Russian.
U.S. Sales Only.

A formulation of the asymptotic dynamics representation allowing consturction of the Poincare-invariant space of asymptotic states different from the Fock one is proposed. The formulation makes it possible to receive the quantitative description of the structure of infrared divergencies of matrix elements in the interaction representation. The theory with the Hamiltonian interaction gPSIPSIPHI is examined as an example, where PHI is a massless scalar field and PSI is a massive fermion field. (Atomindex citation 11:503371)

JINR-R-2-9693 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Role of the Relativistic Kinematics in the Pion-Deuteron Scattering.
G. A. Emel'yanenko, T. I. Kopalejshvili, and A. I. Machavariani. 1976, 5p
In Russian.
U.S. Sales Only.

The consecutive taking into account of the relativistic kinematics in the calculations of pion-deuteron scattering length is carried out and turns out to be sufficiently important. (Atomindex citation 10:428740)

JINR-R-2-9723 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Signal Velocity and Gauge Invariance.
M. I. Shirokov. 1976, 21p
In Russian.
U.S. Sales Only.

An external current, localized in a volume Vsub(S), can induce a change of any observable in V sub(D) only when the time R/C/ will elapse after the current switching on, R being the distance between Vsub(S) and Vsub(D). This causality principle is justified for such quantum electrodynamics observables as field intensities E and H. The number of electrons in Vsub(D)(or square of the modulus of the electron wave function U(x), behave (macro) causally only if this quantity is defined properly. The phase of U(x) changes macroancausally but it has the form of a gauge transformation U(x) implies U(x)expie lambda(x). If the latter is considered to be unobservable then any electrodynamics signals travel not faster than light and vice versa. (Atomindex citation 09:415232)

JINR-R-3-11392 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Study on the exp 147 Sm(N, alpha) exp 144 Nd Reaction on 2 KeV Neutrons.
V. P. Vertebnii, V. A. Dolgov, A. L. Kirilyuk, A. F. Fedorova, and V. A. Vtyurin. 1978, 10p
In Russian.
U.S. Sales Only.

First results of the measurements of the alpha spectrum from the (n, alpha) reaction averaged over a large number of initial states - neutron resonances at Esub(n) = 2.0 keV are given. Mean cross sections of alpha-transitions to the ground and first excited state in the exp 147 Sm(n, a) exp 144 Nd reaction are obtained. The ratio of the corresponding reduced alpha-widths appears to be equal to 0.7sup(+0.16)sub(-0.2) which differs from the unity predicted by the statistical theory, but confirms the qualitative conclusion of the semimicroscopic theory. (Atomindex citation 09:413626)

JINR-R-4-11278 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Microscopic Description of the Coupling Between the Ground (G), beta - and gamma - Bands.
F. Gryummer, D. Karadzhov, I. N. Mikhailov, E. Nadzhakov, and J. Piperova. 1978, 21p
In Russian.
U.S. Sales Only.

A microscopic analysis of the coupling between the ground-state (g), beta and gamma bands has been carried out without using the adiabatic description of the rotation itself (the refusal of the cranking model (CM)). The analytical expressions for the density matrices with provision for "direct" mixing of the bands have been obtained. It is shown that it is possible to determine the model hamiltonian parameters using the microscopic model. It is shown that the account of "direct" mixing of the bands leads to the renormalization of the formules of CM and for the random phase approximation. (Atomindex citation 11:501487)

JINR-R-4-11563 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Unified Description of Direct and Resonance Processes in the Radiative Pion Capture.
V. V. Balashov, and R. Vyunsh. 1978, 11p
In Russian.
U.S. Sales Only.

Radiation pion capture by light nuclei on the basis of a unified theory of direct and resonance processes is discussed. In the framework of the particle-hole variant of the shell model with continuum calculated are the spectrum of hard gamma - quanta and the angular gamma n-correlation in the exp 16 O(pi , gamma n) exp 15 N reaction. The 1p-1h state basis is too poor for the quantitative description of the transformations in exp 16 O. The calculated photon spectrum is but in a qualitative agreement with the experiment. (Atomindex citation 10:428668)

JINR-R-4-11732 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Description of Neutron and Giant Resonances within the Quasiparticle-Phonon Nuclear Model.
V. G. Solov'ev. 1978, 50p
In Russian.
U.S. Sales Only.

The general assumptions of the quasiparticle-phonon model of complex nuclei are given. The

system of basic equations and their approximate solutions are obtained. The approximation is chosen so as to obtain the most correct description of few-quasiparticle components rather than of the whole wave function. The method of strength functions is presented, which plays a decisive role in practical realization of the quasiparticle-phonon model for the description of some properties of complex nuclei. The range of applicability of the quasiparticle-phonon nuclear model is determined as few-quasiparticle components of the wave functions at low, intermediate and high excitation energies averaged in a certain energy interval. The fragmentation of single-particle states in deformed nuclei and the dependence of the neutron strength functions for the one-nucleon transfer reactions of type (d,p) and (d,t) on the excitation energy are studied within this model. The s-, p- and d-wave neutron strength functions are calculated at the neutron binding energy and a good agreement with experiment is obtained. The radiative strength functions are well described in spherical nuclei. The influence of the tail of the giant dipole resonance on the E1-strength functions is studied. The energies and Elambda strength functions for the giant multipole resonances are calculated in spherical and deformed nuclei, and a good description of their widths is obtained. (Atomindex citation 11:501554)

JINR-R-4-11770 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Integral Equation for the Wave Function of Three Identical Particles in the Boundary Condition Model. Pt. 7. The Consideration of Higher Partial Waves. Two-Body Problem.
V. N. Efimov. 1978, 15p
In Russian.
U.S. Sales Only.

The present paper is an introduction of a series of works which consider higher partial waves in the three-body problem with pair interaction described via the boundary condition model. The question is discussed of the most adequate method of considering the three-body problem on the basis of formal boundary conditions for the two-body wave function. It is shown that such a method is that one based on the three-body Schrodinger equation. For the sake of later considerations with this method some major results of application of the boundary condition model to the two-body problem are summarized. (Atomindex citation 10:464977)

JINR-R-4-12283 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Coulomb Isospin Mixing in Nuclei.
D. I. Salamov, N. I. Pyatov, and M. I. Baznat. 1979, 16p
In Russian.
U.S. Sales Only.

A brief review of the Coulomb isospin mixing in nuclei is given. Attention is paid to the microscopic approach in which the isospin mixing of nuclear states is caused by the self-consistent Coulomb potential. The isospin impurities in this approach are defined through the matrix elements of the Fermi decay of the isobaric states to the parent-nucleus ground state. An analysis is given for the numerical calculations of characteristics of isobaric states and Fermi transitions in intermediate-mass and heavy spherical nuclei. (Atomindex citation 11:501544)

KFK-1955 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Radiochemie.
Effective Coulomb Barriers for Charged-Particle-Induced Nuclear Reactions.
H. Muenzel. Dec 78, 14p
In German.
U.S. Sales Only.

Values for the effective Coulomb barrier were obtained from experimental excitations for p, d, exp 3 He and alpha reactions. The dependence of the effective Coulomb barrier on the proton number of the target nuclide can be described satisfactorily with the Coulomb equation. However, a correction factor has to be introduced, which depends on the type of projectile and the main reaction mechanism. The values for the Coulomb barrier calculated according to the optical model are too high, especially for heavy target nuclides. (Atomindex citation 10:454126)

KFK-2145 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
FANAC: A Shape-Analysis Program for Resonance Parameter Extraction from Neutron Capture Data for Light and Medium-Weight Nuclei.
F. H. Froehner. Nov 77, 94p
Work performed under United States--West Germany Fast Reactor Exchange Program.
U.S. Sales Only.

A least-squares shape analysis program is described which is used at the Karlsruhe Nuclear Research Center for the extraction of resonance parameters from high-resolution capture data. The FORTRAN program was written for light to medium-weight or near-magic target nuclei whose cross sections are characterized, on one hand, by broad s-wave levels with negligible Doppler broadening but pronounced multi-level interference, and on the other hand, by narrow p-, d- ... wave resonances with negligible multi-level interference but pronounced Doppler broadening. Accordingly, the Reich--Moore multilevel formalism without Doppler broadening is used for s-wave levels, and a single-level description with Doppler broadening for p-, d- ... wave levels. Calculated capture yields are resolution broadened. Multiple-collision events are simulated by Monte Carlo techniques. Up to five different time-of-flight capture data sets can be fitted simultaneously for samples containing up to ten isotopes. Input and output examples are given and a FORTRAN list is appended. 8 figures. (ERA citation 04:045660)

KFKI-1979-28 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Approximate Treatment of Two Soliton Solutions of the Sine-Gordon Equation.
L. Mihaly. May 79, 6p
U.S. Sales Only.

The so-called breather solution of the sine-Gordon equation is phenomenologically described by an appropriately choosen potential acting between two particles. For some applications the method proves to be equivalent to other classical and quantum calculations. (Atomindex citation 11:503327)

KFKI-1979-58 PC **A03**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Viscous Hydrodynamical Model for Relativistic Heavy-Ion Reactions.
L. P. Csernai, and B. Lukacs. Aug 79, 28p
U.S. Sales Only.

In one-dimensional hydrodynamical model the dynamics of heavy-ion collisions is described. The density and temperature increase and the width of the evolving shock front is evaluated in the initial phase. The differential cross section and the rapidity spectrum of the nucleons emitted from the explosion, caused both by the flow and by the thermal energy, are calculated. The description of phase transitions occurring in shock waves is also discussed. (Atomindex citation 11:501464)

KFTI-77-35 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Application of the Matrix Inversion Method in Calculations of Cross Sections of Electron Quasielastic Scattering by Atomic Nuclei.
A. Yu. Korchin, and A. V. Shebeko. 1977, 14p
In Russian.
U.S. Sales Only.

The potentialities of the matrix inversion method in problems on potential particle scattering (rectangular well, Woods-Saxon potential) are studied. The cross sections of quasielastic scattering of electrons on a exp 12 C nucleus are calculated with the aid of this method, due account being taken of interaction of recoil nucleons in the final state. The real Woods-Saxon potential is used to describe this interaction. Theory is compared with experiment. (Atomindex citation 10:428829)

KFTI-77-52 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Processes of Lepton Pair Production by Neutrinos in an Electromagnetic Field of Heavy Nuclei.
V. P. Barannik. 1977, 12p
In Russian.
U.S. Sales Only.

Processes of neutrino production of a lepton pair on heavy nuclei at impinging neutrino energies of the order of the target rest mass are considered. The distributions in the energies and transverse momenta of the pair for the case of arbitrary weak interaction of neutrinos with leptons in the Weisaecker-Williams approximation are calculated. The vector, axial, scalar, pseudoscalar, and tensor variants of four-fermion interaction are considered. It is shown that the account of the nuclear structure enables one to apply the Sudakov technique for calculating the differential cross sections of weak processses. (Atomindex citation 10:428476)

KFTI-77-53 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Spectra of Bremsstrahlung Pair Production of Heavy Charged Leptons in Fragmentation Region of Incident Electron.
V. P. Barannik. 1977, 12p
In Russian.
U.S. Sales Only.

The process of bremsstrahlung production of a pair of heavy charged leptons is considered, assuming the most general interaction of a heavy lepton with an electromagnetic field. The differential cross section of the above process in the energies of the particles produced was obtained in the Weizsaecker-Williliams approximation. The calculations were made with the use of the Sudakov technique. (Atomindex citation 10:428475)

KMU-HEP-7806 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Quark and Gluon Transverse Momenta and QCD Predictions for Large Transverse Momentum Particle Production.
J. Ranft, and G. Ranft. Apr 78, 11p
U.S. Sales Only.

Large p/sub perpendicular/ single-particle and single-jet cross sections according to QCD perturbation theory are calculated with parton transverse momenta taken into account. Good agreement is found with data at transverse momenta from 3 GeV/c up to 16 GeV/c. The inclusion of parton transverse momenta is essential to obtain agreement with data at intermediate energies sqrt s approximately equal to 20 to 30 GeV. (Atomindex citation 11:501371)

KMU-HEP-7808 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Polarization and the Parton Model: Factorization of Mass Singularities.
J. Kripfganz. 1978, 10p
U.S. Sales Only.

Lepton pair production from polarized hadrons is studied in low-order QCD perturbation theory. As in the spin averaged case, leading logarithm mass singularities are found to factorize and have the same structure as in deep inelastic lepton scattering. This justifies (up to terms 1/logQ exp 2) the usual parton model approach: Hard scattering cross-sections are calculated as convolution of Q exp 2 -dependent hadron spin structure functions and Born-term parton helicity cross-sections. The prescription also remains correct if polarization of final-state leptons is measured. (Atomindex citation 11:501350)

KMU-HEP-7810 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
QCD Three-Jet Production in Large p/sub Perpendicular/ Processes.
J. Kripfganz, and A. Schiller. 1978, 9p

U.S. Sales Only.

The contribution of the hard scattering subprocess quark + quark implies quark + quark + gluon to two-particle inclusive distributions at large p/sub perpendicular/ is studied. It is shown to be accessible experimentally, and agrees with recent data on azimuthal distributions in the adequate kinematical region. (Atomindex citation 11:501351)

KMU-HEP-7905 PC **A03**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Three-Jet Production in Large Transverse Momentum Reactions.
A. Schiller. Mar 79, 33p
U.S. Sales Only.

2-jet inclusive distributions at large transverse momentum are calculated in the framework of perturbative QCD. The event structure in terms of thrust and spherocity variables and also the pi /sub T/-distribution are studied. The perturbative p/sub out/ distribution is discussed. The hard scattering cross-section for quark+quark implies quark+quark+hard gluon is given. (Atomindex citation 11:501375)

KMU-HEP-7908 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Double-Logarithmic Quark and Gluon Form Factors and the Evolution of Parton Jets.
R. Kirschner. Jun 79, 12p
U.S. Sales Only.

A formula for the two-parton distribution inside an initial quark or gluon with fixed invariant mass of the two partons is derived in the leading logarithmic approximation of QCD. The result contains double-logarithmic contributions in terms of reduced quark and gluon form factors. (Atomindex citation 11:501348)

KMU-HEP-7910 PC **A02**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
QCD - Weak Interference and Predictions for Vector Boson Signals in Hadronic Jet Cross Sections in Polarized and Unpolarized Proton-Proton and Antiproton-Proton Collisions.
G. Ranft, and J. Ranft. Jul 79, 13p
U.S. Sales Only.

We study the implications of QCD - weak interference terms on vector boson peaks in two-jet and single-jet cross sections and spin asymmetries in unpolarized and polarized proton-proton and antiproton-proton collisions at collider energies. It is found that the interference terms strongly influence the cross section: The vector boson peaks in proton-proton cross sections and parity-violating asymmetries disappear below the interference terms at the lower energies. In antiproton-proton collisions, however, the vector boson peaks survive and measurements of parity-violating spin asymmetries in double- and single-jet cross sections should lead to clear and detectable signals for the vector bosons. (Atomindex citation 11:501369)

KMU-HEP-7911 PC **A03**/MF **A01**
Karl-Marx-Univ., Leipzig (German D.R.). Sektion Physik.
Interference of QCD and Weak Interactions and the Detection of Vector Bosons by Hadronic Jets: Proton-Proton and Antiproton-Proton Collisions with Polarized and Unpolarized BEAMS.
G. Ranft, and J. Ranft. Aug 79, 46p
U.S. Sales Only.

Two-jet and single-jet cross sections and spin asymmetries are studied in polarized and unpolarized proton-proton and antiproton-proton collisions at collider energies sqrt s = 200 to 1000 GeV. It is found that the interference terms between strong (QCD) and weak interactions strongly influence the parity violating weak cross section; esp., the vector boson peaks in pp cross sections and parity-violating asymmetries are masked almost completely at the lower part of the energy range considered. In antiproton-proton collisions the vector boson peaks survive and a measurement of parity violating asymmetries of double- and single-jet cross sections should lead to clear signals of the vector bosons. (Atomindex citation 11:501370)

LA-8310-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Evidence for Quarks and Gluons.
H. L. Anderson. Apr 80, 36p
Contract W-7405-ENG-36

The evidence from the experiments of deep inelastic electron and muon scattering and of mu pair production at high energy that the neutron and proton are made of quarks and gluons is given. (ERA citation 05:024970)

LBL-10801 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Decays of the Heavy Lepton, tau (1785).
C. A. Blocker. Apr 80, 127p
Contract W-7405-ENG-48
Thesis.

The structure of the weak hadronic current coupled to the tau is investigated via some of the hadronic decays of the tau. The vector current coupling is determined by measuring the tau implies rho nu /sub tau/ branching ratio. The axial-vector coupling is determined by measuring the tau implies pi nu /sub tau/ branching ratio. The Cabibbo structure of the hadronic current is established by observing the decay tau implies K*(890) nu /sub tau/ and measuring its branching ratio. The branching ratios for the decays tau implies e anti nu /sub e/ nu /sub tau/ and tau implies mu anti nu /sub mu / nu /sub tau/ are measured as a normalization for the hadronic decays and as a check on the validity of the measurements. The leptonic branching ratios agree well with previous experiments. From a kinematic fit to the pion energy spectrum in the decay tau implies pi nu /sub tau/, an upper limit (95% confidence level) of 245 MeV is placed on the tau neutrino mass. From a simultaneous fit of the center of mass energy dependence of the tau production cross section and the pion energy spectrum in the decay tau implies pi nu / sub tau/, the tau mass is determined to be 1.787 +- .010 GeV/c. All properties of the tau measured here are consistent with it being a sequential lepton coupled to the ordinary weak hadronic current. (ERA citation 05:024846)

LPC-77-06 PC **A03**/MF **A01**
College de France, 75 - Paris. Lab. de Physique Corpusculaire.
Evidence for Jet Structures in Large Psub(T) Events and the Influence of Parton Fermi Motion.
G. Fontaine. May 77, 41p CONF-7705112-3
Symposium on hadron structure and multiparticle production, Kazimierz Dolny, Poland, 24 May 1977.
U.S. Sales Only.

A summary of some experimental results of the C.C.H.K. Collaboration is presented. It covers the production of large Psub(T) charged particles (Psub(T) > 2 GeV/c) emitted at theta approximately 20 exp 0 or 45 exp 0 in the center of mass. The jet structure of the events is reasonably reproduced by a simple quark-parton model with vector gluon exchange, if the partons are allowed to have a non negligible initial transverse momentum, and if the fragmentation of the spectator partons is taken into acco. (Atomindex citation 09:416175)

LPC-77-08 PC **A02**/MF **A01**
College de France, 75 - Paris. Lab. de Physique Corpusculaire.
Four-Photon Anomaly in QED.
G. Bordes. Jun 77, 10p
U.S. Sales Only.

An improved version of Chanowitz's calculation of the operator Schwinger term is presented. By means of an expression for the current commutator as a function of energy, it is shown that one may obtain Chanowitz's result independently of the order of the equal-time limit and of the phase-space integration. It is conjectured therefore that the problem in the previous calculations by the point-splitting method and by application of the Ward identity to the vacuum-polarization tensor is not due to an ambiguity in the ordering of these operations. (Atomindex citation 09:416017)

LPC-79-01 PC **A02**/MF **A01**
College de France, Paris. Lab. de Physique Corpusculaire.
Leading LOG Derivation of the Sterman-Weinberg Jets.
A. Nicolaidis. Jan 79, 10p
U.S. Sales Only.

A derivation of the Sterman-Weinberg formula in the spirit of the leading log approximation is presented. This approach suggests a simple way to evaluate the jet cross-sections in different hard processes. A comparison is made with exact calculations, and the validity of this approach is discussed. (Atomindex citation 11:504094)

LPCC-T-77-02 PC **A07**/MF **A01**
Caen Univ., 14 (France). Lab. de Physique Corpusculaire.
K Exp - N and K exp - p Elastic Scattering in K exp - Deuterium Collisions Between 1.2 and 2.2GeV/C. Measurement of Angular Distributions, Partial Wave Analysis.
M. Louvel. 1977, 145p
In French.Thesis.
U.S. Sales Only.

This experiment has been performed at the CERN PS using a beam of negative kaons with momenta from 1.2 to 2.2 GeV/c incident on a liquid deuterium target. By means of an elctronic apparatus the process K exp - d implies K exp - np(spectator) was identified and recorded; this process is basically the same as the K exp - n elastic reaction insofar as the spectator proton has low momentum. The elastic reaction was derived from the above process by taking into account the Fermi motion of the target neutron and by introducing the appropriate corrections to compensate for the effects due to the composite nature of the deuteron. These results, constituting the first extensive collection of data on the pure isospin 1 anti-K N state, have been used in conjunction with other data in a preliminary partial wave analysis of the anti-K N elastic system over the c.m. energy range from 1.84 to 2.23 GeV. Mainly for testing purposes, a similar amount of data has been collected for the K exp - p elastic reaction also from K exp - d collisions (K exp - d implies K exp - pn. (Atomindex citation 09:416477)

LPNHEX-79-01 PC **A02**/MF **A01**
Ecole Polytechnique, Palaiseau (France). Lab. de Physique Nucleaire et des Hautes Energies.
Reaction E exp + E exp - implies mu exp + mu exp - (Or tau exp + tau exp -) with Two Neutral Weak Bosons at LEP Energies.
B. Degrange. Sep 78, 22p
U.S. Sales Only.

The standard Salam-Weinberg model of weak and electromagnetic interactions is in agreement with almost all the experimental data. Recently the discovery of parity violation in reactions of polarized electrons on nucleons at SLAC has provided a remarkable confirmation of the standard model. The model-independent formulae giving the cross-section, the charge asymmetry and the longitudinal polarization of the final leptons are given for e exp + e exp - implies mu exp + mu exp - . The general features of models based on the symmetry groups are summarized. The predictions of two of them are presented for the reactions e exp + e exp - implies mu exp + mu exp - . (Atomindex citation 11:504022)

LSNN-78-04 PC **A03**/MF **A01**
Nantes Univ. (France). Lab. de Spectroscopie Nucleaire.
Classical Studies of the Ellipsoidal Shapes for Dynamical Deformation Theories of the Nucleus.
B. Remaud. 1978, 35p
U.S. Sales Only.

The shape-dependent functions of the Liquid Drop and the Droplet Models are analytically calculated for an ellipsoid. Using the ellipsoidal symmetries, these functions (including the curvature function) are written in terms of three basic expressions. The nuclear deformation energy can be calculated in a simple way for axially symmetric and asymmetric ellipsoidal nuclei whatever the magnitude of the deformation is. (Atomindex citation 11:501536)

LUIP-7806 PC **A02**/MF **A01**
Lund Univ. (Sweden). Fysiska Institutionen.

Space-Time Development of Nuclear Collisions in Central Heavy Ion Reactions at Very High Energies.
I. Otterlund, and E. Stenlund. Jun 78, 14p
LUNFD6/NFFK-7006
U.S. Sales Only.

We present a model for colliding nuclear matter at very high energies. The model is an expansion of independent particle models for hadron-nucleus interactions. (Atomindex citation 10:436006)

MPI-PAE/Exp.El.-74 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Physik und Astrophysik, Munich (Germany, F.R.).
Interpretation of Forward A sub 2 Production in pi N Implies A sub 2 N Collisions in Terms of rho and F Regge Exchanges.
E. J. Sacharidis. Sep 78, 26p
U.S. Sales Only.

Forward pi N implies A sub 2 N is considered in the light of rho and f Regge exchanges. The helicity amplitudes are parametrized in the t-channel and use is made of the full rotation functions of the second kind with appropriate 'regularization' in the forward direction. With a very simple structure of the residue functions, we find that three constants, namely the nucleon non-flip coupling of the f and the flip and non-flip couplings of the rho suffice to describe adequately forward A sub 2 production in pi N implies A sub 2 N collisions at high energies. (Atomindex citation 10:439677)

NBI-HE-78-23 PC **A02**/MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Approximate Q.C.D. Lower Bound for the Bag Constant B.
H. B. Nielsen. 1978, 15p
U.S. Sales Only.

Using an article by Savvidy from 1977 in which a state in Q.C.D. with lower energy than the perturbative vacuum was found, the author calculates an approximate lower bound for the M.I.T. bag constant B relative to the Q.C.D. coupling parameter lambda . With an M.I.T. bag constant Bsup(1/4)=145 MeV the author finds lambda sub(P)<=0.89 GeV when the propagator of the gluon is used to renormalize the coupling constant. (Atomindex citation 10:427712)

NBI-HE-78-25 MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Exact Second Order Calculation of the Quark Form Factors in QCD and Some Applications.
H. G. Bohr, and M. Laursen. Sep 78, 33p
U.S. Sales Only. Microfiche copies only.

The two quark form factors F sub 1 (k exp 2) and F sub 2 (k exp 2) are calculated as functions of the four-momentum transfer k in lowest-order QCD. The Feynman gauge is used, and the regularization is the minimal subtraction scheme of 't Hooft and Veltman. The result is discussed in the asymptotic limits where k exp 2 is deep Euclidean (k exp 2 implies - infinity) and k exp 2 is static (k exp 2 implies 0) which are equivalent to the two interesting cases of QCD where the quark mass goes to zero and to infinity, respectively. The aspect of Sudakov discontinuities arising from quark mass shell problems is also discussed. Finally the charmonium 'Lamb shift' is estimated. (Atomindex citation 10:427634)

NBI-HE-78-38 PC **A03**/MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Hidden Higgs Lagrangian in QCD.
J. Ambjoern, N. K. Nielsen, and P. Olesen. Dec 78, 40p
U.S. Sales Only.

It is shown that a previously found instability for the SU(2) Yang-Mills field equation can be removed by a (1+1)-dimensional Higgs mechanism. The SU(2) results are generalized to SU(N), with special emphasis on SU. (Atomindex citation 10:442226)

NORDITA-77/36 PC **A05**/MF **A01**
Nordisk Inst. for Teoretisk Atomfysik, Copenhagen (Denmark).
Nuclear One-Body Dissipation.
J. Randrup. Aug 77, 91p
U.S. Sales Only.

Recent advances in the theory of nuclear dissipation are discussed. For slow collective motion the independent-particle model remains adequate and the dissipation mechanism can be understood by considering a Knudsen gas in a deforming container. A general classical theory for one-body dissipation is surveyed and the quantal corrections are discussed. Contact with experiment is made through idealized fission and collision calculations. (Atomindex citation 10:428898)

PB80-203078 Not available NTIS
National Bureau of Standards, Washington, DC.
Efficient Neutron Production Using Low-Energy Electron Beams.
Final rept.,
C. D. Bowman. 1980, 4p
Pub. in Nuclear Science Engineering 75, p12-15 1980.

A comparison of gamma and atomic cross sections shows that neutron production with an electron beam can be as energy efficient with 10-MeV electrons as with the conventionally used 30- to 100-MeV electrons. Neutron production from tungsten using 100-MeV electrons is compared with a thin tungsten converter followed by a deuterium-containing target using electrons near 10 MeV.

PCCF-T-78-03 PC **A05**/MF **A01**
Clermont-Ferrand-2 Univ., Aubière (France). Lab. de Physique Corpusculaire.
Study of Photon-Photon Collision Reactions on DCI.
A. Falvard. 1978, 94p
In French.
U.S. Sales Only.

Interesting aspects specific to photon-photon collisions (/gamma//gamma/ /yields X; X is a leptonic or hadronic system C=+1, any J/sup p/ (a priori)) are first discussed. Then, the introduction, in experimental conditions at DCI, of a double Williams-Weiszacker approximation to compute ee /yields/ eeX reaction cross sections is justified. This is made after a calculation developed in the frame of an 0(2.1) group formalism. Next, the important points of two-photon experiments are presented; essentially, necessity of tagged electrons diffused at zero degrees. The tagging system on DCI is then described: drift chambers of good spatial accuracy (0.2 mm), proximity to the beam are its main characteristics. Finally, the background in detectors and the expected counting rates for ee/ yields/ee exp + (2/gamma/) e exp + e exp - , / mu/ exp + /mu/ exp - , /pi/ exp + /pi/) are estimated. (Atomindex citation 11:495798)

RL-78-026 PC **A02**/MF **A01**
Science Research Council, Chilton (UK). Rutherford Lab.
Study of the Reaction pi exp + p implies delta exp + + pi exp 0 pi exp 0 at 4 GeV.
G. Borreani, R. Ely, and C. M. Fisher. Jun 78, 21p
U.S. Sales Only.

The reaction pi exp + p implies pi exp + p pi exp 0 pi exp 0 is studied at an incident momentum of 4 GeV using the track sensitive target technique. Peripheral delta exp + + pi exp 0 pi exp 0 events are selected and comparisons made with the predictions from pi exp + pi exp - data. These data allow a detailed analysis of the possible backgrounds contributing to the excess of events at low pi exp 0 pi exp 0 masses. (Atomindex citation 09:416163)

RL-78-072 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford Lab.
Multilepton Phenomenology.
R. J. N. Phillips. 1978, 14p
U.S. Sales Only.

Conventional mechanisms are shown to explain the multilepton production data presented within present uncertainties. The experimental rates tend to lie above theoretical expectations, so there is room for new physics contributions. However, apart from two exceptional HPWF trimuons characterized by very high trimuon energy with low hadron energy, the distributions and structure of the events themselves do not yet call for anything beyond charm. (Atomindex citation 10:472039)

RRK-78-16 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Gauge Independence as a Consequence of Gauge Covariance.
K. Yokoyama. May 78, 10p
U.S. Sales Only.

Gauge independence of a physical S-matrix is proved without perturbation in a satisfactory gauge-field theory with gauge covariance. The proof goes through both for Abelian and non-Abelian cases, and the independence is a consequence of gauge covariance and asymptotic completeness. (Atomindex citation 10:427758)

RRK-79-4 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Determination of the Electronic Neutral-Current Couplings from E-D and E-p Scatterings in Connection with the Effects of Sea Components.
T. Oka. Mar 79, 21p
U.S. Sales Only.

We make analyses of the parity-violating asymmetries of electron-deuteron and electron-proton deep inelastic scatterings including sea quark contribution and adopting three different kinds of parton distribution functions. Both results from electron-deuteron and from electron-proton scatterings coincide with the prediction of the Weinberg-Salam model. Our results are found to be insensitive to the difference among the three kinds of parton distribution functions. We also study the x, y, and sin exp 2 theta /sub w/ dependences of A/Q exp 2 in the Weinberg-Salam model. Experiments at higher y value will be useful for more precise determination of the Weinberg angle theta/ sub w/. (Atomindex citation 11:501363)

SAND-78-1557c MF **A01**
Los Alamos Scientific Lab., NM.
Mu exp + Diffusion and Trapping in High Purity and Oxygen-Doped Nb.
J. A. Brown, R. H. Heffner, M. Leon, D. M. Parkin, and M. E. Schillaci. 1978, 5p CONF-780911-3, LA-UR-78-2119
Contract EY-76-C-04-0789
Meeting on muon spin rotation, Rorschach, Switzerland, 4 Sep 1978, Portions of document are illegible.
Microfiche copies only.

Data are presented for the temperature dependence of the muon depolarization rate between 10 and 120 K for three samples of niobium of varying purity. Two samples, each containing approximately 200 ppM substitutional Ta and interstitial concentrations of 10 ppM and 560 ppM (mostly O), respectively, were studied. A third sample containing only 3 ppM Ta and an estimated 10 ppM total interstitial impurities was also measured. The results indicate that even at the lowest temperatures studied the depolarization of the muon is dominated by traps associated with impurities. 9 references. (ERA citation 04:035117)

SLAC-PUB-2367 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Further Tests of Parity Violation in Inelastic Electron Scattering.
C. Y. Prescott. Aug 79, 8p CONF-790642-8
Contract EY-76-C-02-0515
International conference on high energy physics, Geneva, Switzerland, 27 Jun 1979.

Further measurements of parity-violating asymmetries in inelastic scattering of polarized electrons from deuterium were made for a range of y values from 0.15 to 0.36. Only a small y-dependemce was observed in the asymmetries. Using the quark-parton model, these results are in good agreement with the Weinberg-Salam predictions. A value of the parameter sin exp 2 theta/sub W/ = 0.224 +- 0.020 was obtained. 4 figures. (ERA citation 05:009417)

SLAC-PUB-2395 PC **A03**/MF **A01**
Stanford Linear Accelerator Center, CA.
Nuclear Phenomena and the Short Distance Structure of Hadrons.
S. J. Brodsky. Sep 79, 47p

Contract EY-76-C-03-0515

In certain cases, nuclear corrections to hadronic phenomena depend in detail on the nature of quark and gluon interactions, as well as the effects of jet development within the nuclear medium. Applications of quantum chromodynamics to fast particle production in nuclear collisions, nuclear form factors, and shadowing in deep inelastic lepton processes are reviewed. Also discussed is a new approach to particle production in hadron-nucleus, nucleus-nucleus and deep-inelastic nuclear reactions from the standpoint of a color-neutralization model. 74 references. (ERA citation 05:003774)

SLAC-PUB-2396 PC **A03**/MF **A01**
Stanford Linear Accelerator Center, CA.
Impact of Higher Twist Terms on the Analysis of Scaling Violation.
R. M. Barnett. Sep 79, 34p CONF-790774-1
Contract EY-76-C-03-0515
SLAC summer institute on particle physics: quantum chromodynamics, Stanford, CA, USA, 9 Jul 1979.

A critical discussion is given of analyses of scaling violation in deep-inelastic scattering in the context of QCD. Several possible approaches are examined. Higher twist contributions are defined, and it is shown that they can have a crucial impact on tests of QCD. Higher twist terms can dramatically affect R = sigma/sub L//sigma/sub T/. QCD may be harder to test than previously realized. 17 references. (ERA citation 05:009422)

SLAC-PUB-2402 PC **A04**/MF **A01**
Stanford Linear Accelerator Center, CA.
Massive Lepton Pair Production.
R. Stroynowski. Sep 79, 62p CONF-790774-2
Contract EY-76-C-03-0515
SLAC summer institute on particle physics: quantum chromodynamics, Stanford, CA, USA, 9 Jul 1979.

In this review of massive lepton pair production the Dreil-Yan mechanism is defined in terms of the parton model, and the modifications expected from Quantum Chromodynamics description of the process are described. The problems of the phenomenology of the data are described. Included in addition are particle-type dependence, mass spectra, momentum spectra of lepton pairs, Quantum Chromodynamics phenomenology of lepton pair production, angular distributions, structure functions and quark distributions, and the future outlook. 40 references. (ERA citation 05:010793)

SLAC-PUB-2409 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Parity Nonconservation in Polarized Electron Scattering at High Energies.
C. Y. Prescott. Oct 79, 15p
Contract EY-76-C-03-0515

Recent observations of parity violation in inelastic scattering of electrons at high energy is discussed with reference to the process e(polarized) + D(unpolarized) implies e + X. The kinetics of this process, the idealized case of scattering from free quark targets, experimental techniques and results, and relations to atomic physics of parity violation in bismuth and thallium atoms with a model independent analysis. 17 references. (ERA citation 05:002072)

SLAC-PUB-2423 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Angular Distributions in the Lepton Pair Production.
R. Stroynowski. Oct 79, 7p CONF-7909104-1
Contract EY-76-C-03-0515
10. international symposium on multiparticle dynamics, Goa, India, 25 Sep 1979.

The angular distributions of high mass lepton pairs are reviewed. It is argued that the detailed study of polar distributions provide the evidence for the substantial contributions to the Drell-Yan process from the higher order QCD effects. It is also pointed out that the first order QCD Compton diagrams predict nontrivial azimuthal dependence which could be measured experimentally. 13 references. (ERA citation 05:009424)

TLU-62-78 PC **A03**/MF **A01**
Tandemacceleratorlaboratoriet, Uppsala (Sweden).
Scattering and Breakup Probabilities in Nuclear Few-Body Systems.
A. Johansson. 1978, 43p
U.S. Sales Only.

One can state that the three-body model calculations based on the solution of Faddeev-type equations have been successful in predicting scattering and breakup probabilities for the three-nucleon case as well as for the alpha -d system. However, much remains to be done, such as more precision experiments and the laborious critical evaluation of existing data. It would be extremely valuable to have a quick way to handle the Coulomb problem. Experiments on d- exp 16 O and d- exp 40 Ca might aid in finding a way to do this. It will still be quite some time before we can make any definite statements about the offshell effects or about three-body forces in the three-nucleon case, i e effects which are not already contained in the knowledge of the triton binding energy. (Atomindex citation 10:429094)

TLU-63-78 PC **A02**/MF **A01**
Tandemacceleratorlaboratoriet, Uppsala (Sweden).
Radiative Capture of Fast Neutrons in Yttrium and Cerium.
A. Lindholm, L. Nilsson, I. Bergqvist, and B. Paalsson. 1978, 22p
U.S. Sales Only.

Gamma-ray spectra from the reactions exp 89 Y(n, gamma) exp 90 Y and exp 140 Ce(n, gamma) exp 141 Ce have been recorded at six neutron energies between 6.2 and 10.9 MeV. The gamma radiation was detected by a large NaI(Tl) scintillator using time-of-flight techniques to suppress background radiation. Integrated capture cross sections to bound final states were determined as well as partial cross sections for gamma-ray transitions to the (2psub(1/2) exp -1) pi (2dsub(5/2)sub(nu) ground state doublet in exp 90 Y to the 2fsub(7/2) ground state in exp 141 Ce. The shapes of the gamma-ray spectra and the cross sections are compared with results from a recent experiment and with predictions based on the direct-semidirect capture model. The two experiments give essentially identical results in the overlapping energy region. The gross features of the spectra as well as the excitation functions are reasonably well accounted for by the model. (Atomindex citation 10:429130)

UCRL-82991 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Fission Cross Section of exp 245 Cm from 10 exp -3 EV to 10 exp 4 EV.
R. M. White, J. C. Browne, R. E. Howe, J. H. Landrum, and J. A. Becker. 15 Oct 79, 5p
Contract W-7405-ENG-48

The neutron-induced fission cross section of exp 245 Cm measured from .001 eV to 10 keV using the LLL 100-MeV Linac. The resonance data are analyzed with a multilevel-multichannel R-matrix code. The statistical distribution of R-matrix parameters extracted from the analysis are investigated and comparisons are made with previous work. 4 reference. (ERA citation 05:002161)

UCRL-83005 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Neutron Cross Sections for Fusion.
R. C. Haight. Oct 79, 12p CONF-791058-1
Contract W-7405-ENG-48
International conference on nuclear cross sections for technology, Knoxville, TN, USA, 22 Oct 1979.

First generation fusion reactors will most likely be based on the exp 3 H(d,n) exp 4 He reaction, which produces 14-MeV neutrons. In these reactors, both the number of neutrons and the average neutron energy will be significantly higher than for fission reactors of the same power. Accurate neutron cross section data are therefore of great importance. They are needed in present conceptual designs to calculate neutron transport, energy deposition, nuclear transmutation including tritium breeding and activation, and radiation damage. They are also needed for the interpretation of radiation damage experiments, some of which use neutrons up to 40 MeV. In addition, certain diagnostic measurements of plasma experiments require nuclear cross sections. The quality of currently available data for these applications will be reviewed and current experimental programs will be outlined. The utility of nuclear models to provide these data also will be discussed. 65 references. (ERA citation 05:003788)

UCRL-83368 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Representative-Vector Method for Calculating Operator-Moments.
S. D. Bloom, and R. F. Hausman, Jr. Sep 79, 26p CONF-790959-1
Contract W-7405-ENG-48
Conference on theory and applications of moment methods in many fermion systems, Iowa City, IA, USA, 10 Sep 1979.

The utility of operator-moments or traces in the various applications of spectral-distribution theory is well documented. To take full advantage of the powerful entree that spectral distribution theory offers in nuclear physics, it may be generally necessary to have many moments beyond th first two hamiltonian moments <H> and <H exp 2 >. In order to calculate, for one example, level densities reliably in the excitation-energy regions of physical interest, it may be necessary to have the moments <J/sub z/ exp 2 H/sup n/> and of course <H/sup n/> with n ranging as high as 8 or so. The subject of this paper is a new method for obtaining these higher moments which is based on the use of random multiparticle vectors, called random representative vectors (RRV), in conjunction with an appropriate shell-model space and hamiltonian. With this method it is possible to calculate average properties of very large spaces with well-defined symmetries by averaging the results over a relatively few RRV. The demonstration of the statistical formulas of the RRV method is given in the next section. In the following section numerical results are given for the test case of 5 nucleons in the single-particle orbits 1d/sub 5/2/, 2s/sub 1/2/ ; and 1d/sub 3/2/ (A = 21), as well as some results for 12 nucleons in the same orbits plus the 1f/sub 7/2/ orbit (A = 28). With the representative-vector method one can evaluate average moments of any operator O that commutes with H so long as the application of O to the RRV does not produce a new vector which exceeds the memory capacity of the computer. 3 figures, 5 tables. (ERA citation 05:002164)

UCRL-83462 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Limits of Thermodynamic Models for Nuclear Level Densities.
S. M. Grimes. Sep 79, 26p CONF-790959-2
Contract W-7405-ENG-48
Conference on theory and applications of moment methods in many fermion systems, Iowa City, IA, USA, 10 Sep 1979.

The current status of thermodynamic models as applied to nuclear level densities is reviewed. Considerable refinement has taken place during the last fifteen years, with the result that some of the undesirable assumptions originally required by the model are no longer necessary. Some problems remain, however, particularly in calculating level densities for deformed nuclei. Furthermore, some related parameters, such as the positive-parity negative-parity ratio for levels and the spin cutoff parameter are more sensitive to the presence of two-body interactions than the total level density. Improvement in characterization of nuclear level densities will require use of techniques which can incorporate the effects of two-body interactions in the level density calculation. 25 references. (ERA citation 05:003834)

UFPB-DF-1/78 PC **A02**/MF **A01**
Universidade Federal da Paraiba, Joao Pessoa (Brazil). Dept. de Fisica.
Relativistic Model for Baryons with a Scalar Raising Potential.
V. O. Rivelles, and F. M. Witkowski. May 78, 11p
U.S. Sales Only.

The Bogolyunbov model for baryons permits one to include the relativistic effect in a first approximation when quarks as Dirac particles interacting

among themselves through a central potential are considered. Further, based on gauge theories and the results of the charmonium model, it is assumed that the potential is scalar and raising. It is shown that, for several processes involving baryons, the results obtained by taking relativistic effects into account are better than the non-relativistic ones. (Atomindex citation 10:427728)

UH-511-360-79 PC **A05**/MF **A01**
Hawaii Univ., Honolulu.
Eighth Hawaii Topical Conference in Particle Physics.
M. D. Jones, and A. Pramudita. 1979, 83p
CONF-790898-(Sum)
Contract EY-76-C-03-0511
Hawaii topical conference in particle physics, Honolulu, HI, USA, 8 Aug 1979.

Summaries of 21 papers from a conference on particle physics are presented. (ERA citation 05:009415)

UH-511-364-79 PC **A02**/MF **A01**
Hawaii Univ., Honolulu. Dept. of Physics and Astronomy.
High Energy Physics with DUMAND.
V. J. Stenger. 7 Nov 79, 7p CONF-790899-1
Contract EY-76-C-03-0511
14. Pacific science congress, Khabarovsk, USSR, Aug 1979.

Neutrino interactions have proved to be a major source of fundamental information. DUMAND is the only experiment currently conceived which will be able to study neutrino interactions at TeV energies. A survey is made of some of the high energy neutrino physics experiments which have been proposed for DUMAND. Event rates are estimated for the standard 1 km exp 3 optical array. It is shown that W-bosons with masses up to 160 GeV are detectable. The possibilities of heavy quark production, the search for leptoquarks, and other problems are discussed. 8 references. (ERA citation 05:010761)

WIS-Ph-78/10 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Physics.
Reggeisation of Scalars in Field Theory.
P. H. Dondi, and H. R. Rubinstein. 1978, 8p
U.S. Sales Only.

The Reggeisation of the Scalar field in Scalar Q.E.D. has been studied by the Unitarity-Analyticity method and it was found that the Scalar Reggeises, but that care must be taken to ensure that the results agree with field theory calculations. (Atomindex citation 10:428491)

WIS-Ph-78/14 PC **A05**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Inclusive Quasi Elastic Deuteron Production.
E. A. Remler, and A. P Sathe. 1978, 83p
U.S. Sales Only.

It is argued that the measurement of the inclusive quasi-elastic deuteron production cross section coming from intermediate energy nucleons bombarding nuclei is of considerable theoretical interest. The inclusivity of the measurement leads to simplifications and allows a quasi-classical description to be used. A simple, heuristic and quantum mechanically well-defined formula is derived which includes for the first time a realistic treatment of the multiple scattering complications inherent in the problem. A rough calculation based on this formula gives reasonable agreement with the limited data available. It is concluded that the reaction is not highly peripheral. A greater possibility of yielding information on nuclear correlation is believed to be offered by this and related reactions. The theory of this reaction is shown to be fundamental to recent quasi-classical theories of heavy ion collisions. (Atomindex citation 10:428900)

WIS-Ph-78/17 MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Effect of Genuine Pion Absorption and Emission.
A. S. Rinat, E. Hammel, Y. Starkand, and A. W. Thomas. 1978, 11p
U.S. Sales Only. Microfiche copies only.

Intermediate pion absorption and reemission has been included in a computation of d elastic cross sections and polarization for pion energies through the resonance region. The effect on these observables is appreciable. (Atomindex citation 10:429165)

WIS-Ph-78/25 MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Large Order Behavior of Perturbation Theory and Mass Terms.
Y. Frishman, and S. Yankielowicz. 1978, 22p
U.S. Sales Only. Microfiche copies only.

Large order behaviour of perturbation theory of PHI exp 4 in four dimensions in presence of mass terms is estimated. A new scale comes into the coefficient functions. For mass m and order K this scale is m sqrt K. (Atomindex citation 10:427665)

WIS-Ph-78/33 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Physics.
Vacuum Copies and Perturbation Theory.
Y. Frishman, and R. Roth. Aug 78, 13p
U.S. Sales Only.

The effects of vacuum copies on perturbation theory are studied. The usual procedure of perturbation expansion around and zero copy leads to incorrect results in the abelian case. However, in non-abelian gauge theory the above usual procedure reproduces the correct perturbation series. (Atomindex citation 10:427666)

WIS-Ph-78/36 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
Giant Monopole States in the Suzuki Model.
M. W. Kirson. 1978, 18p
U.S. Sales Only.

It is shown that Suzuki's monopole-monopole force model of interacting fermions in harmonic-oscillator states can produce a giant monopole state at any energy above the unperturbed energy of 2 h-bar omega . The criterion previously used to determine the force strength, when correctly applied, produces collapse in the R.P.A. For physically meaningful results, the force must have a positive strength parameter. An exact algebraic solution of the model is presented, and it is argued that the model does not imply anything about giant monopole states in real nuclei. (Atomindex citation 10:428810)

WIS-Ph-79/32 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
Transverse Momentum Distributions in Electron-Positron Annihilation.
B. C. Yunn. 1979, 12p
U.S. Sales Only.

Perturbative QCD predictions on transverse momentum distributions in e exp + e exp - implies jets by a single photon annihilation are worked out in order alpha /sub s/. The scaling behavior emerges. (Atomindex citation 11:501391)

WIS-Ph-79/34 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
Azimuthal Angular Correlations of Jets in Electron-Positron Annihilation.
B. C. Yunn. 1979, 11p
U.S. Sales Only.

QCD is used to study the azimuthal angular dependence of jet distribution produced in electron-positron annihilation. Results are compared with those of a scalar colored gluon theory. (Atomindex citation 11:501390)

ZfK-341 PC **A04**/MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic).
Absolute Neutron Capture Cross Sections of Uranium-238 by Spherical Shell Transmission Measurements.
K. Dietze. Sep 77, 69p
In German.
U.S. Sales Only.

The required accuracy of capture cross sections of the fertile isotope exp 238 U in the keV-region is 1 - 2%. In experiments is now achieved 3 - 5%, but the data have discrepancies up to 20%. An analysis of literature data at 24 and 30 keV has given average values with an uncertainty of +-10%. In a spherical shell transmission experiment in indirect geometry on the 1000 m-TOF-path of the pulsed fast reactor IBR-30 of the JINR Dubna the sphere transmission function has been measured in a wide energy range using exp 3 He-proportional counter batteries and five shell targets. Absolute average ABBN-group capture cross sections of exp 238 U in the energy range 215 eV to 100 keV and capture cross sections of 24 and 30 keV have been determined using Monte Carlo calculations and two different methods to consider the resonance self shielding effect. The accuracy of the data is about 5%. The results are compared with literature data and support the tendency of the less increasing capture cross section of exp 238 U from 40 keV down to 1 keV. In this energy range they are about 10 - 20% lower than the ABBN-70 data. (Atomindex citation 09:416427)

ZJE-207 PC **A02**/MF **A01**
Skoda, Plzen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren.
New Possibilities of Calculating Independent Fission Product Yields.
V. Valenta. 1977, 21p
U.S. Sales Only.

A survey is given of formulae for the calculation of independent fission product yields. An algorithm is presented based on the classical method using the Gaussian distribution. Corrections allowing the taking into account of even-odd nucleon pairing effects are described. A critical approach to the classical theory serves as a starting point for the proposal of a new algorithm for computing the independent fission product yield distribution based on the discrete (binomial) distribution. The errors caused by neglecting the even-odd effects range from 20 to 30% in fractional independent yields if computed using the classical method. (Atomindex citation 10:435680)

20I. Plasma Physics

AD-A086 456/1 PC **A08**/MF **A01**
California Univ Los Angeles School of Engineering and Applied Science
Studies of Nonlinear Phenomena in Plasmas.
Final rept. 1 Jan 79-31 Mar 80,
P. K. C. Wang. Mar 80, 151p UCLA-ENG-8012, AFOSR-TR-80-0502
Grant AFOSR-79-0050

This report summarizes the result of a study on nonlinear phenomena in plasmas with main emphasis on developing deterministic theories for plasma turbulence based on the Ruelle-Takens theory of strange attractors, and on the interaction of solitons. The main results include the demonstration of the occurrence of turbulence-like solutions in a simplified Zakharov model for Langmuir turbulence and a number of nonlinear three-wave interactions. The stability of mode-converted lower-hybrid solitons is also studied. (Author)

AD-A086 619/4 PC **A02**/MF **A01**
New York Univ NY Courant Inst of Mathematical Sciences
Unstable Continuous Spectrum in Magnetohydrodynamics,
James H. Hammer, and Eliezer Hameiri. 24 Jan 79, 8p AFOSR-TR-80-0478
Contract W-7405-eng-48, Grant AFOSR-76-2881
Pub. in Physics of Fluids, v22 n9 p1700-1706 Sep 79. Prepared in cooperation with California Univ., Berkeley. Lawrence Berkeley Lab.

No abstract available.

AD-A086 620/2 PC **A02**/MF **A01**
New York Univ NY Courant Inst of Mathematical Sciences
Kinetic Theory of Evolution of Anisotropic Plasmas,
Young-ping Pao. 2 Apr 79, 10p AFOSR-TR-80-0480

Contract DOE-EY-76-C-02-3077, Grant AFOSR-76-2881
Pub. in Physics of Fluids, v22 n12 p2315-2323 Dec 79.

No abstract available.

AD-A086 621/0 PC **A02**/MF **A01**
New York Univ NY Courant Inst of Mathematical Sciences
Compressible Magnetic-Field Reconnexion,
James Hammer, and Eliezer Hameiri. 5 Jul 78, 13p AFOSR-TR-80-0481
Grant AFOSR-76-2881
Pub. in Jnl. of Plasma Physics, v22 pt2 p245-256 1979.

No abstract available.

AD-A086 725/9 PC **A03**/MF **A01**
Naval Research Lab Washington DC
High Order ZIP' Differencing of Convective Terms.
Memorandum rept.,
Steven T. Zalesak. 8 May 80, 34p NRL-MR-4218, AD-E000 458

The ZIP flux form for differencing the term (wv) sub x, where w is a convected quantity and v is a convective velocity, is observed to be equivalent to differencing the alternative expression wv sub x + w sub x v using centered second order finite differences. Based on this observation, the extension of the ZIP flux concept to arbitrarily high order accuracy is given. Computational examples show the advantage both of the ZIP flux concept itself and of its higher order forms within the context of flux-corrected transport (FCT) algorithms. (Author)

AD-A086 727/5 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Properties of Ablatively Accelerated Targets.
Memorandum rept.,
B. H. Ripin, S. E. Bodner, S. H. Gold, R. H. Lehmberg, and E. A. McLean. 16 May 80, 34p NRL-MR-4212, AD-E000 456

Targets are ablatively accelerated to high velocity (> 10 to the 7th power cm/s) with good hydrodynamic efficiency (about 20%) using low-irradiance (10 to the 13th power - 10 to the 14th power) long (3 - 4 ns) Nd-laser pulses. Detailed properties of the interaction and acceleration as well as comments upon the suitability of this approach to the laser fusion application are presented. Results of unique 'double-target' experiments are also included.

AD-A086 729/1 PC **A04**/MF **A01**
Naval Research Lab Washington DC
The Nonlinear Dynamics of MHD Unstable Plasmas.
Memorandum rept.,
Wallace M. Manheimer. 12 May 80, 69p NRL-MR-4175, AD-E000 453
Continuation of Rept. no. NRL-MR-4000, AD-A071 099.

This is a continuation of NRL Memorandum Report 4000 and it discusses the nonlinear theory of MHD instabilities. (Author)

AD-A086 784/6 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Hard X-Ray Spectrum from a One-Fluid Laser Plasma Model.
Memorandum rept.,
D. G. Colombant, and W. M. Manheimer. 27 May 80, 15p NRL-MR-4241, AD-E000 463
Contract DE-A108-79DP40092

Comparisons between hard x-ray experimental spectra and those obtained from a one-dimensional, one-temperature fluid laser-produced plasma model show good agreement over several oders of magnitude in x-ray intensity and for Nd-laser irradiances varying between 1 and 8 x 10 to the 15th power W/sq cm. The key to this agreement is the careful modeling of electron energy flux limitation by return current driven ion acoustic turbulence. (Author)

CLM-R-199 PC **A02**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
Effect of an Anisotropic Conducting Wall on the Instabilities of a Pinch.
D. C. Robinson. Sep 79, 11p
U.S. Sales Only.

The dispersion relation for a thin skin pinch surrounded by an anisotropic thin conducting wall or liner and a perfectly conducting wall is obtained. Instabilities can grow on a timescale for the penetration of helical fields through the liner but near the marginal case for the liner they grow on a much faster hybrid timescale. (Atomindex citation 11:503827)

CONF-791056-72 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Measurement of the 2.35 MeV Window in O + N.
C. H. Johnson, J. L. Fowler, N. W. Hill, and J. M. Ortolf. 1979, 5p
Contract W-7405-ENG-26
International conference on nuclear cross sections for technology, Knoxville, TN, USA, 22 Oct 1979.

Calculations are made showing that the ion temperature of a deuterium plasma with a Maxwellian distribution can be found by measuring the transmission of the d-d neutrons through liquid oxygen. The method is useful for temperatures up to 6 keV. It does not depend on the absolute neutron yield but does require accurate total neutron cross sections for oxygen. In this experiment the cross section of natural oxygen was measured from 2.0 to 3.0 by neutron time-of-flight at the Oak Ridge Electron Linear Accelerator (ORELA). The fitted cross sections have a 110.9 +- 1.7 mb minimum at 2351.5 keV. (ERA citation 05:024992)

FUPH-R-146 PC **A03**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Numerical Calculations of Magnetoacoustic Oscillations in Toroidal Plasmas.
A. L. McCarthy. Aug 78, 27p
U.S. Sales Only.

Magnetoacoustic oscillations in toroidal argon and hydrogen plasmas have been calculated numerically and compared with those in cylindrical plasmas. The toroidal plasmas show reduced enhancement at resonance and shifted resonant frequencies. The position of maximum enhancement of the oscillation fields at resonance which occurs on the minor axis of a large aspect ratio torus is displaced not only toward lower static B field values but also in a direction at right angles to /B/ when the aspect ratio is small. As the frequency is increased to values, only moderately higher than resonance, the spatial distribution of the oscillation fields rapidly becomes more complicated than those for the cylindrical plasmas. (Atomindex citation 10:424551)

INIS-mf-4469 PC **A10**/MF **A01**
AN Latvijskoj SSR, Riga. Inst. Fiziki.
General and Theoretical Problems. Vol. 1.
1978, 214p CONF-780479-(Sum.)
In Russian.Riga meeting on magnetic hydrodynamics, Riga, USSR, 17 Apr 1978.
U.S. Sales Only.

Various papers from this conference were processed individually for inclusion in the TIC data basse as they were received on ATOMINDEX tapes. (Atomindex citation 09:406569)

IPF-78-5 PC **A05**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
Measurement of the Ion Profile by Stationary CO sub 2 -Laser Scattering from a Hydrogen Plasma.
H. Hailer. 1978, 92p
In German.
U.S. Sales Only.

Collective laser light scattering with a cw CO sub 2 -laser is applied to a magnetically stabilized hydrogen arc (nsub(e)=2.5 - 3.0 x 10 exp 15 cm exp -3 , kT=1.5 - 2.5 eV). In the experimental geometry (theta = 90 exp 0 , lambda = 10.6 mu) the scattering parameter is alpha approximately equal to 7. With a laser power of 160 W and a Ge:Hg-detector NEP of 6 x 10 exp -13 W/ sqrt Hz sufficient signal-to-noise ratios are achieved using lock-in techniques. Spectral resolution is performed by pressure scanning a Fabry-Perot-Spectrometer with Ge-plates. The measured ion profiles agree with theory for a thermal plasma. Values for the ion temperatures are obtained. (Atomindex citation 10:464332)

IPP-2/233 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Soft X-Ray Fluxes as a Diagnostic for Hot Plasmas.
P. Smeulders. Jan 79, 36p
U.S. Sales Only.

The continuous emission spectrum through different absorbers is calculated for given impurity distributions. The coronal equilibrium has mainly been used. Estimates based on finite life time effects are given for departures from the coronal equilibrium. In particular, the effects of the molybdenum L-line radiation and of the radial profiles are studied. Graphs and tables allow analytic corrections to be made. In the case of the W VII A Stellarator good agreement with other electron temperature and Zsub(eff) measurments has been found. (Atomindex citation 11:503839)

IPP-3/40 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Cross Sections and Rate Coefficients for the Interaction of a Monoenergetic Neutral Lithium Beam with a Maxwellian Plasma.
K. McCormick. Jan 78, 39p
U.S. Sales Only.

Cross sections and rate coefficients for the interaction of a monoenergetic neutral lithium beam with a Maxwellian plasma are presented. Experimentally determined cross sections from the literature are used for the ionization of lithium atoms by electron impact and by charge exchange on protons as well as for the excitation of the Li(2s-2p) line by electrons. The analytical expressions of Cryzinski are employed to compute the cross sections for the ionization of lithium by ions and for the excitation of the Li(2-2p) line by ions. The calculations are done for electron and proton temperatures in the range 10 eV to 10 keV with the lithium beam energy being varied as a parameter between 4 and 100 keV. (Atomindex citation 10:419667)

KFKI-1978-21 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Comments on the Dispersion Equation of a Turbulent Plasma - an Inhomogeneous, Magnetoactive Case.
A. Ag. Mar 78, 25p
U.S. Sales Only.

A weakly turbulent, magnetoactive plasma is considered in an inhomogeneous case with anisotropic temperature distribution. The dispersion relation is established following a method developed by Tsytovich and Nekrasov. The correction coefficients are calculated in the three principal scaling modes: (1) the turbulent frequencies predominate, (2) the cyclotronic velocities of the macroinstabilities predominate, (3) the turbulent frequencies are lower. (Atomindex citation 10:427606)

KFTI-77-39 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Plasma Physics and Controlled Thermonuclear Fusion Problems.
1977, 21p
In Russian.
U.S. Sales Only.

Separate abstracts for each paper have been entered into the data base. (Atomindex citation 10:434247)

LA-8226-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Relativistic Electron Beam Plasma Heating Experiment.
M. D. Montgomery, and J. V. Parker. Apr 80, 12p
Contract W-7405-ENG-36

An intense (5 x 10 exp 5 Amp/cm exp 2), relativistic (5 MeV), electron beam will be used to investi-

gate the heating of small volumes (approx. 5 to 10 cm exp 3) of dense plasma (10 exp 17 to 10 exp 18 electrons/cm exp 3) to kilovolt temperatures via the electrostatic two-stream instability. (ERA citation 05:024978)

LA-8325-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Ohmic Heating of the Reversed-Field Pinch.
R. Gerwin. Apr 80, 39p
Contract W-7405-ENG-36

Simple analytic expressions are found for the global heating rate and the time needed to achieve global power balance with radiation and other losses, in useful agreement with large RFP transport codes. A simple condition is noted, which insures that the heating can be accomplished before appreciable resistive evolution occurs in the pinch profile. The product of poloidal beta, beta /sub theta/, and toroidal current, I, that characterizes a condition of global power balance is derived subject to the above-mentioned condition without making key assumptions used by earlier investigators. First, a perfectly steady state (with local power balance) is not assumed, nor is it appropriate to do so. Secondly, the cross-field resistivity is not required to be classical. Since the value of (beta /sub theta/ I) plays a fundamental role in determining the kind of device one requires, the foundations of this value are important. (ERA citation 05:024979)

MSNW-80-1144-1 PC **A04**/MF **A01**
Mathematical Sciences Northwest, Inc., Bellevue, WA.
Plasma Rotation in Reversed-Field theta Pinches.
L. C. Steinhauer. Feb 80, 56p
Contract AC06-76ET53027

Field reversed plasmas have been observed to spin up and develop a destructive rotating m = 2 instability. While the instability threshold has been reasonably well characterized, the cause of rotation remains obscure. Of the several mechanisms proposed, one of the most likely is the following: end shorting on open field lines spins up that portion of the plasma; viscous drag then spins up the plasma on closed field lines. We develop theoretical models to describe these processes. The predicted behavior falls into three regimes. For low aspect ratio (less than or equal to 2.5) the plasma is highly viscous, rotates as a rigid body and spins up to instability in a few Alfven transit times. At intermediate aspect ratio (2.5 to 4) the plasma is weakly viscous; it reaches instability in the viscous transfer time which lengthens very rapidly for higher aspect ratio. At high aspect ratio (greater than or equal to 4) spin up is slower than the resistive decay of the plasma, and instability should not arise. (ERA citation 05:025025)

NRL-MR-4241 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Hard X-Ray Spectrum from a One-Fluid Laser Plasma Model.
D. G. Colombant, and W. M. Manheimer. 27 May 80, 15p
Contract ES-77-A-01-6021

Comparisons between hard x-ray experimental spectra and those obtained from a one-dimensional, one-temperature fluid laser-produced plasma model show good agreement over several orders of magnitude in x-ray intensity and for Nd-laser irradiances varying between 1 and 8 x 10 exp 15 W/cm exp 2 . The key to this agreement is the careful modeling of electron energy flux limitation by return current driven ion acoustic turbulence. (ERA citation 05:025014)

N80-28191/8 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Current-Carrying Plasma in Ferromak.
K. Ikuta. Apr 80, 16p IPPJ-458

The unique nature of the magnetic configuration of current-carrying plasma in ferromak is demonstrated and compared with the stellarator configuration. The presence of magnetic islandes in the ferromak configuration is suggested.

N80-28192/6 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Reflection of Oblique Electron Thermal Modes in an Inhomogenous Plasma.
T. Ohnuma, T. Watanabe, and H. Sanuki. Apr 80, 12p IPPJ-457

In an inhomogeneous magnetoplasma, reflection of an oblique electron thermal mode radiated from a local source is investigated experimentally and theoretically near the electron plasma frequency layer. The experimental observation of reflection in the lower plasma density region rather than the electron plasma frequency layer is found to be in qualitative accord with the theoretical reflection, which is obtained from a kinetic theory in an inhomogeneous magnetoplasma. The reflection of the thermal mode is also compared with that of an electromagnetic mode at the electron plasma frequency layer.

N80-28193/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Comptomization and Radiation Spectra of X-Ray Sources. Calculation of the Monte Carlo Method.
L. A. Pozdnyakov, I. M. Sobol, and R. A. Sonyayev. Jun 80, 10p NASA-TM-76181, PR-447
Contract NASW-3198
Transl. Into English of "Komptonizatsiya I Spektra Izlucheniya Rentgenogskikh Istochnikov. Raschety Metoda Monte Karlo", Rept. Pr-447 Acad. Of Sci. USSR, Moscow, 1978 12 p. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The results of computations of the Comptomization of low frequency radiation in weakly relativistic plasma are presented. The influence of photoabsorption by iron ions on a hard X-ray spectrum is considered.

N80-28194/2 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Resonant Interaction of Solitons and Zakharov-Shabat Theory.
F. Kako, and N. Yajima. Apr 80, 11p IPPJ-456

Resonant interaction of solitons is studied in detail for the Kadomtsev-Petviashvili equation. Resonance solutions are discussed in the framework of the Zakharov-Shabat theory. The breakdown of the Zakharov-Shabat theory associated with the soliton-resonance is not essential and can be avoided.

N80-28197/5 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Heat Transport Due to the Collisionless Tearing Instabilities.
I. Katanuma. May 80, 36p IPPJ-461

Collisionless tearing instabilities and the associated electron heat transport are investigated by using a two-and-one-half dimensional particle simulation code. It is shown that a collisionless drift tearing instability saturates at a low amplitude and turns into a nonlinear pure tearing instability. The electron internal energy profile is flattened within the magnetic island. The electron heat conductivity obtained from the heat flow across the singular surface is proportional to W(4) in the linear phase and to (dW/dt)W squared in the nonlinear phase of the tearing instability. Here W is the half width of the magnetic island. A theoretical model to explain these results is also presented.

N80-28198/3 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Interaction of Ion-Acoustic Solitons in Two-Dimensional Space.
F. Kako, and N. Yajima. Apr 80, 36p IPPJ-459

Nonlinear evolutions of a two dimensional ion-acoustic wave system are studied analytically and numerically. The solution describing the resonant interaction of three solitons in two-dimensional space is obtained under the approximation of long wavelength and small but finite amplitude. Numerical solutions reveal an importance of soliton resonances in nonlinear developments of two dimensional ion acoutic waves.

ORNL/CSD/TM-109 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
HLYWD: A Program for Post-Processing Data Files to Generate Selected Plots or Time-Lapse Graphics.
J. K. Munro, Jr. May 80, 65p
Contract W-7405-ENG-26

The program HLYWD is a post-processor of output files generated by large plasma simulation computations or of data files containing a time sequence of plasma diagnostics. It is intended to be used in a production mode for either type of application; i.e., it allows one to generate along with the graphics sequence, segments containing title, credits to those who performed the work, text to describe the graphics, and acknowledgement of funding agency. The current version is designed to generate 3D plots and allows one to select type of display (linear or semi-log scales), choice of normalization of function values for display purposes, viewing perspective, and an option to allow continuous rotations of surfaces. This program was developed with the intention of being relatively easy to use, reasonably flexible, and requiring a minimum investment of the user's time. It uses the TV80 library of graphics software and ORDERLIB system software on the CDC 7600 at the National Magnetic Fusion Energy Computing Center at Lawrence Livermore Laboratory in California. (ERA citation 05:025015)

PB80-201197 PC **A05**/MF **A01**
Kentucky Univ., Lexington. Dept. of Mechanical Engineering.
Local Fluid Constriction of a Confined Arc Plasma.
Final rept.,
C. J. Cremers, T. L. Eddy, and H. S. Hsia. Oct 77, 100p HTTRL-TR-23, NSF/RA-770913
Grant NSF-GK-31453

Some details of the plasma arc with local constriction including effects of injection velocity and mass flow-rate are investigated. The arc-plasma generator produces high temperature gas by converting electrical energy to thermal energy. A gas passes through an arc discharge maintained between two electrodes by an electric potential. The plasma generator used in this study consists basically of an annular anode, a conical cathode, a cylindrical channel, and an injection nozzle. Experiments were conducted on a confined argon plasma-arc at atmospheric pressure. Special attention was devoted to the injection region to determine which factors affect performance of such a plasma arc device. A constricted arc discharge with local fluid constriction (LFC) markedly increases the local electric field strength with an attendant increase in dissipated energy which raises the plasma temperature near the axis 1000K. Boundary layer separation causes severe wall heating and a continuous increase in Reynolds number downstream of the injection slit. Spectroscopic studies indicate that temperatures in such a constricted arc are as much as three times the size of the arc attachment but has little effect on axial current density at the anode.

PPGM-L-175-78 PC **A02**/MF **A01**
Gama Research Centre, Jogyakarta (Indonesia).
Solution of Plasma Diffusion Equation of Two and Three Dimensions.
1978, 14p
In Indonesian.
U.S. Sales Only.

In this paper it has been discussed the solutions of two and three dimensional plasma diffusion equations. The method of Fourier transform was used in the solutions of the plasma diffusion equations. (Atomindex citation 11:503830)

PPPL-AF-89 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Self-Consistent Kinetic Theory of Stochasticity.
J. A. Krommes. Aug 79, 15p CONF-7906106-2
Contract EY-76-C-02-3073
International workshop on intrinsic stochasticity in plasmas, Cargese, Corsica, France, 18 Jun 1979.

It is argued that renormalized kinetic theory is the appropriate tool with which to study macroscopic properties of stochastic systems. Functional techniques are described which afford a self-consistent description of nonlinear excitation, propagation, and dielectric response of fluctuations in the stochastic regime. (ERA citation 05:002247)

PPPL-1556 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.

Particle Stochasticity Due to Magnetic Perturbations of Axisymmetric Geometries.
H. E. Mynick, and J. A. Krommes. Nov 79, 41p
Contract EY-76-C-02-3073

The quasilinear theory of collisionless test particle diffusion in stochastic magnetic fields is extended to include the effects of finite gyroradius rho and particle drifts (including magnetic trapping). A canonical framework is used, in which both the criterion for onset of stochasticity and the diffusion tensor scale with field-particle coupling coefficients g/sub l/. The g/sub l/ contain all the information about a given particle's unperturbed orbit and the perturbation fields with which it interacts. The modification of transport due to finite rho and drifts is thus found by comparison of the g/sub l/ including these effects to their driftless, rho implies o limit. (ERA citation 05:005154)

PPPL-1600 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Fluctuations and Transport in an Inhomogeneous Plasma.
W. M. Nevins, and L. Chen. Nov 79, 38p
Contract EY-76-C-02-3073

A formalism is developed for calculating the equilibrium fluctuation level in an inhomogeneous plasma. This formalism is applied to the collisionless drift wave in a sheared magnetic field. The fluctuation level is found to be anomalously large due to both the presence of weakly damped normal modes and convective amplification. As the magnetic shear is reduced, the steady-state fluctuation spectrum is found to increase both in coherence and in amplitude. The transport associated with this mode is evaluated. The diffusion coefficient is found to scale as D is proportional to B exp 2 /nT/sup 1/2/. (ERA citation 05:005156)

PPPL-1607 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Ordinary-Mode Fundamental Electron Cyclotron Resonance Absorption and Emission in the Princeton Large Torus.
P. C. Efthimion, V. Arunasalam, and J. C. Hosea. Nov 79, 16p
Contract EY-76-C-02-3073

Fundamental electron cyclotron resonance damping for 4 mm waves with ordinary polarization is measured for propagation along the major radius traversing the midplane of the plasma in the Princeton Large Torus (PLT). Optical depths obtained from the data are in good agreement with those predicted by the relativistic hot plasma theory. Near blackbody emission over much of the plasma midplane is obtained and, in conjunction with the damping measurements, indicates that the vessel reflectivity is high. The practical use of ordinary mode fundamental electron cyclotron resonance heating (ECRH) in existing and future toroidal devices is supported by these results. (ERA citation 05:005136)

PPPL-1609 PC **A04**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Two-Dimensional Analysis of Trapped-Ion Eigenmodes.
R. Marchand, W. M. Tang, and G. Rewoldt. Nov 79, 70p
Contract EY-76-C-02-3073

A fully two-dimensional eigenmode analysis of the trapped-ion instability in axisymmetric toroidal geometry is presented. The calculations also takes into account the basic dynamics associated with other low frequency modes such as the trapped-electron instability and the ion-temperature-gradient instability. The poloidal structure of the mode is taken into account by Fourier expanding the perturbed electrostatic potential, PHI, in theta. (ERA citation 05:009501)

PPPL-1658 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Vortex Formation During RF Heating of Plasma.
R. W. Motley. May 80, 50p
Contract AC02-76CH03073

Experiments on a test plasma show that the linear theory of waveguide coupling to slow plasma waves begins to break down if the rf power flux exceeds approx. 30 W/cm exp 2 . Probe measurements reveal that within 30 mu s an undulation appears in the surface plasma near the mouth of the twin waveguide. This surface readjustment is part of a vortex, or off-center convective cell, driven by asymmetric rf heating of the plasma column. (ERA citation 05:024980)

PPPL-1659 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Energy Principle with Global Invariants.
A. Bhattacharjee, R. L. Dewar, and D. A. Monticello. May 80, 17p
Contract EY-76-C-02-3073

A variational principle is proposed for constructing equilibria with low free energy in toroidal plasmas in which relaxation is dominated by a tearing mode of single helicity. States with current density vanishing on the boundary are constructed. Theoretical predictions are compared with experimental data from reversed field pinches and tokamaks. (ERA citation 05:025017)

PPPL-1663 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
N-Dependence of Ballooning Instabilities.
R. L. Dewar, J. Manickam, R. C. Grimm, and M. S. Chance. May 80, 27p
Contract EY-76-C-02-3073

The critical beta for stability against ideal hydromagnetic internal ballooning modes as a function of toroidal mode number, n, is calculated for two different equilibrium sequences by use of a finite element technique (n less than or equal to 20), and a WKB formalism (n greater than or equal to 5). The agreement between the two methods is good in the overlap region 5 approx.less than or equal to n approx. less than or equal to 20. The WKB formula reduces to the 1/n correction at very high n, but is much more accurate at moderate n. The critical beta vs n curves exhibit oscillatory structure at low n, but in both sequences the lower bound on beta /sub c/ approx. 5%. For reactor parameters, finite Larmor radius effects are not expected to have a large effect on this beta -limitation. (ERA citation 05:025026)

RISO-M-2116 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Particle Simulation Code for Analysis of Nonlinear Electron Oscillations in a Plasma Waveguide.
V. A. Turikov. Aug 78, 26p
U.S. Sales Only.

A description is given of a computer code for simulation of electron oscillations in a magnetized plasma in a cylindrical waveguide. The one-dimensional particle-in-cell method with the reverse linear interpolation of charge density is used. The program has options for treating nonlinear processes in a plasma with periodical and reflecting boundary conditions. For periodical conditions, Poisson's equation is solved by means of the Fourier method. For reflecting conditions, the double recursive procedure is used. The values of the potential derivatives at the space grid points are calculated by means of the parabolic interpolation. The main purpose of the program is to investigate nonlinear phenomena in a plasma column after applying a short localized impulse of an external electric field. (Atomindex citation 10:428243)

RISO-M-2120 PC **A02**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Wave Propagation in an Ion Beam Plasma System.
T. D. Jensen, P. Michelsen, and J. J. Rasmussen. Aug 78, 24p
U.S. Sales Only.

The spatial evolution of a velocity - or density - modulated ion beam is calculated for stable and unstable ion beam plasma systems, using the linearized Vlasov - Poisson equations. The propagation properties are found to be strongly dependent on the form of modulation. In the case of velocity modulation, the perturbation grows initially and then shows a periodic change of amplitude along the beam, while in the case of a density modulation only an instability causes growth. The findings are in agreement with experimental results obtained by Sato et al. (Atomindex citation 10:428149)

RL-79-080 PC **A03**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Time Resolved Density Profiles of Laser Heated Plasmas.
O. Willi, R. G. Evans, and A. Raven. Nov 79, 30p
U.S. Sales Only.

By including the ponderomotive pressure of the laser light in a simple 1 D fluid simulation code the predicted electron density profiles, for irradiances of 3 x 10 exp 14 up to 2 x 10 exp 16 W cm exp -2 , are in extremely good agreement with measurements. Four distinct phases are observed in the fluid behaviour near the critical density and these are compared with analytic models. Furthermore the laser electric field near the critical density is found to be modulated in time with a period of the order of 10 ps. (Atomindex citation 11:506759)

SAND-79-1118C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Magnetic Flux Compression by Expanding Plasma Armatures.
T. P. Wright, L. Baker, M. Cowan, and J. R. Freeman. 1979, 14p CONF-790540-10
Contract EY-76-C-04-0789
International conference on megagauss magnetic field generation and related topics, Washington, DC, USA, 29 May 1979.

A one-dimensional magnetohydrodynamic computer code has been developed to study magnetic flux compression using explosively driven plasma armatures in cylindrically symmetric systems. This work supports a program to develop a compact, non-destructive, repetitive pulse power generator capable of multimegajoule outputs with pulse widths of about 10 exp -5 sec. Details of the code construction and results of some calculations including the dynamics of the explosive detonation are presented. (ERA citation 04:050896)

SAND-79-2181C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Carbon and Silicon Probes.
W. R. Wampler. 1979, 8p CONF-791057-1
Contract EY-76-C-04-0789
Workshop on hydrogen recycling, Livermore, CA, USA, 17 Oct 1979.

Probes exposed in situ have been used to determine fluxes and energies for deuterium in the plasma boundary regions in PLT for several radial positions. Time resolution can also be achieved by rotating the sample holder behind the aperture during a discharge. Mean particle energies were found to be in the range 100 to 600 eV and incident D fluxes to the probe in the range 10 exp 17 to 10 exp 18 D cm exp -2 s exp -1 . The 1/e fall-off distance for the energy and flux was about 4 cm. Probe measurements such as these provide information needed to assess the relative importance of various processes involved in hydrogen isotope recycling and provide boundary conditions for computer models of energy and particle transport within the plasma. (ERA citation 05:007852)

TRITA-EPP-78-02 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik.
'Horizontal' Therma! Equilibrium Due to Excitation Transfer Between Excited States of Neutral He in Transient Plasma.
N. Brenning. Jan 78, 11p
U.S. Sales Only.

The populations of the levels and the intensities of the spectral lines emitted by neutral helium in a plasma is influenced by excitation transfer between excited levels through collisions with electrons even at very low electron densities. These processes are studied theoretically and experimentally with the following conclusions: (a) Excitation transfer is important for intensities of spectral lines emitted from plasma where the electron density exceeds a few times 10 exp 16 m exp -3 . (b) With increasing electron density, the relative populations of levels with the same main and spin quantum number approach that determined by their statistical weight. This could be regarded as a "horizontal" thermal equilibrium, developed when the helium levels are very far from thermal equilibrium in other respects. (Atomindex citation 10:427776)

TRITA-EPP-78-12 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik.
Observations of Electric Double Layers in a Magnetized Plasma Column.
S. Torven, and D. Andersson. 1978, 14p
U.S. Sales Only.

Strong electric double layers (eV/kTsub(e) approximately 10) are produced in a plasma column confined by an axial magnetic field and maintained by single ended inflow of plasma along the magnetic field. The double layer evolves from an anode sheath. Once it has been formed, its axial position can be controlled by the external electric circuit. The layer exhibits an axial motion back and forth with amplitudes somewhat larger than the layer thickness which is about 30 plasma Debye lengths. (Atomindex citation 10:428415)

UCID-18623 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Rf Heating of Mirrors.
M. Porkolab. 9 Apr 80, 18p
Contract W-7405-ENG-48

A brief overview is presented of potential uses for rf heating of plasmas in mirror devices. While some discussion relating to past experiments is given, the main emphasis is devoted to a review of potential experiments in presently existing devices, and devices under construction or planning. Some predictions are made for plasmas in mirror reactors. (ERA citation 05:024982)

UCRL-83208 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Optical Design of the TMX Thomson Scattering Diagnostic.
A. M. Frank. 7 Nov 79, 6p CONF-791102-6
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The Thomson Scattering Diagnostic on TMX was built to measure the electron temperature in the plug. The design was based on the 2XII system built by Tom Simonen. Substantial improvements were realized over the original design, these include: (1) improved sensitivity, (2) simultaneous multiple position sampling, (3) multiple pulse capability, (4) achromatic imaging, (5) vacuum alignment capability, (6) high reliability, and (7) built in calibration and performance monitoring. (ERA citation 05:003868)

UCRL-83805 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Imaging System for Obtaining Space- and Time-Resolved Plasma Images on TMX.
H. A. Koehler, and C. E. Frerking. 8 Apr 80, 15p
CONF-800320-3
Contract W-7405-ENG-48
Topical conference on high temperature plasma diagnostics, Los Angeles, CA, USA, 17 Mar 1980.

A Reticon 50 x 50 photodiode array camera has been placed on Livermore's Tandem Mirror Experiment to view a 56-cm diameter plasma source of visible, vacuum-ultraviolet, and x-ray photons. The compact camera views the source through a pinhole, filters, a fiber optic coupler, a microchannel plate intensifier (MCPI), and a reducer. The images are digitized (at 3.3 MHz) and stored in a large, high-speed memory that has a capacity of 45 images. A local LSI-11 microprocessor provides immediate processing and display of the data. The data are also stored on floppy disks that can be further processed on the large Livermore Computer System. The temporal resolution is limited by the fastest MCPI gate. The number of images recorded is determined by the read-out time of the Reticon camera (minimum 0.9 msec). The spatial resolution of approximately 1.4 cm is fixed by the geometry and the pinhole of 0.025 cm. Typical high-quality color representation of some plasma images are included. (ERA citation 05:024995)

UCRL-84270 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Heating by the Raman Instability.
K. G. Estabrook, and W. L. Kruer. 11 Apr 80, 13p
CONF-800550-1
Contract W-7405-ENG-48
Anomalous absorption meeting, San Francisco, CA, USA, 28 May 1980.

Computer simulations are presented of the reflection and heating due to stimulated Raman backscatter of intense laser light in large regions of underdense plasma. The heated electron distribution is found to be approximately a Maxwellian of temperature (m/sub e//2)v/sub p/ exp 2 , where v/sub p/ is the phase velocity of the electron plasma wave. A simple model of the reflection is presented. Raman may cause a pre-heat problem with large laser fusion reactor targets. (ERA citation 05:024983)

UWFDM-319 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Interaction of Lower Hybrid Wave Fields with Drift-Cyclotron Loss-Cone Instability.
K. C. Shaing, and R. W. Conn. Oct 79, 27p
Contract EY-76-S-02-2206

The dispersion relation for the drift-cyclotron loss-cone (DCLC) mode in the presence of the lower hybrid wave is calculated using both electrostatic and finite beta models. It is found that there exists a critical beta, beta /sub c/, such that when beta > beta /sub c/, an rf wave of frequency omega sub 0 greater than the lower hybrid frequency omega /sub LH/ can stabilize the drift cyclotron loss cone mode in a mirror plasma. For beta < beta /sub c/, the rf wave can stabilize this mode only when the wave frequency omega /sub LH/ < omega sub 0 < omega *. In either case, if omega sub 0 is much greater than omega /sub LH/, the wave has little effect on the DCLC mode. (ERA citation 05:007864)

20J. Quantum Theory

CBPF-A0001/78 PC **A02**/MF **A01**
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Nonlinear Scalar Field in General Relativity.
T. Kodama, K. C. Chung, and F. Teixeira. Jan 78, 15p
U.S. Sales Only.

A nonlinear short range scalar field is considered in the light of general relativity. The pseudovirial theorem of Rosen is found to be related to the principle of equivalence, in the weak field limit. A self-interaction additive term (lambda)S exp 4 is included in the Lagrangean, which permits nonsingular and source-free systems. A family of static, spherically symmetric solutions is obtained, with a nonlinear spectrum of masses. The gravitational potentials tend to the Schwarzschild ones at infinity, while the scalar field presents Yukawa-type asymptotic behavior. (Atomindex citation 10:427691)

CBPF-A0009/78 PC **A02**/MF **A01**
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Specific Heat, Susceptibility and Frequency of Anharmonic Oscillator: A Test of the Variational Methods.
L. R. da Silva, and C. Tsallis. May 78, 15p
In Portuguese.
U.S. Sales Only.

The quality of approximation of the variational method in statistical mechanics is tested in the case of a classical anharmonic oscillator with a potential of the x exp 2 sup(n)-type and also of the (x exp 2)+(x exp 4)-type. Comparison between the variational and exact results for the specific heat, the electric susceptibility and the mean oscillation frequency shows that the variational method leads to surprisingly good results in the whole domain of temperatures (from T=0 to T implies infinity). In the particular case of the specific heat, this method leads to the exact result for a potential of the x exp 2 (supn)-type, and gives, for a potential of the (x exp 2)+(x exp 4)-type, the exact or almost exact asymptotic behaviors (T approaches 0 and T approaches infinity). (Atomindex citation 10:427744)

CERN-7901 PC **A99**/MF **A01**
European Committee for Future Accelerators.
LEP Summer Study. Vol. 2.
14 Feb 79, 823p
U.S. Sales Only.

Abstracts of individual items from the workshop were prepared separately for the dta base. (Atomindex citation 10:467570)

CNRS-CPT-78-P-1020 MF **A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Ground States of Quantum Spin Systems.
O. Bratteli, A. Kishimoto, and D. W. Robinson.
Jul 78, 15p
U.S. Sales Only. Microfiche copies only.

The authors prove that ground states of quantum spin systems are characterized by a principle of minimum local energy and that translationally invariant ground states are characterized by the principle of minimum energy per unit volume. (Atomindex citation 11:503236)

FRNC-TH-857 PC **A05**/MF **A01**
Paris-6 Univ. (France).
Estimation of High Orders of Perturbation Theory in Quantum Mechanics.
R. Seznec. 1978, 92p
In French.These (3e Cycle).
U.S. Sales Only.

First of all the simple case of an integral of one variable (zero-dimensional model) is examined to illustrate the methods and concepts used. A system of n quantum oscillators 0(n) (spherical model) is then studied. A theory of perturbations around the saddle point dominating the functional integral is developed (theory of perturbations around the instanton). The fluctuation propagator is calculated explicitly. Some properties of the corresponding Feynman diagrams are also investigated. Methods are proposed to generalize the calculations to more complicated potentials. As an example of application the calculations of the first correction to the Lipatovian term are given for the spherical model. (Atomindex citation 11:503354)

IC-79-23 PC **A03**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Collapse Postulate for Observables with Continuous Area.
M. D. Srinivas. Mar 79, 41p
U.S. Sales Only.

In order to provide a mathematical framework for discussing the statistical correlations between the outcomes, when an arbitrary sequence of observables are measured, it is necessary to generalize the conventional von Neumann-Lueders collapse postulate to observables with a continuous spectrum. It is shown that the standard prescription in conventional quantum theory for the joint probabilities of compatible observables is sufficient to characterize, more or less completely, the appropriate "generalized collapse postulate" which associates with each observable a unique "finitely additive expectation valued measure". An interesting feature of the collapse associated with observables with continuous spectra, which again follows from the basic principles of conventional quantum theory, is that it must be formulated in terms of the so-called non-normal conditional expectation; this formulation implies that the joint probabilities associated with successive observations of such observables are not in general sigma-additive. The implications of this non-sigma-additivity on the determination of expectation values, correlation functions, etc., are also investigated. It is demonstrated that the basic prescriptions introduced in this paper constitute a natural completion of the framework of conventional quantum theory for discussing the statistics of an arbitrary sequence of observations. (Atomindex citation 11:503365)

IFVE-OTF-79-60 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Bloch-Nordsiek Model Solution by the Delbourgo-West Method.
A. I. Alekseev, and A. Ya. Rodionov. 1979, 11p

In Russian.
U.S. Sales Only.

The spectral iteration Delbourgo-West method was used to investigate the Bloch-Nordsiek method. It is shown that the method permits one to calculate the full renormalized Green function at the first iteration step. Also, the method permits one to solve exactly the Bloch-Nordsiek model and Schwinger model and to obtain infrared asymptotics in electrodynamics. (Atomindex citation 11:503215)

IFVE-STF-74-37 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Zero Value of the Schwarzschild Mass for a Class of Asymptotically Euclidean Space-Time.
V. N. Folomeshkin. 1974, 12p
U.S. Sales Only.

A class of asymptotically Euclidean, free (Tsub(i)sup(k)= 0) solutions of the Einstein equations (free gravitational waves) is shown to exist for which the Schwarzschild mass is equal to zero. (Atomindex citation 10:427663)

INIS-mf-4304 PC **A03**/MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Mehler's Formulae for Isotropic Harmonic Oscillator Wave Functions and Application in the Green Function Calculus.
E. S. Caetano Neto. 1976, 42p
In Portuguese.Thesis.
U.S. Sales Only.

A stationary Green function is calculated for the Schroedinger Hamiltonian of the multidimensional isotropic harmonic oscillator and for physical systems, which may, somehow, have their Hamiltonian reduced to one in the form of a harmonic oscillator, for any dimension. (Atomindex citation 09:384185)

INIS-mf-4425 PC **A04**/MF **A01**
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Relativistic Phase Space for Bosons and Fermions.
Thesis,
N. R. Teixeira Filho. 1975, 53p
In Portuguese.
U.S. Sales Only.

A correct expression for the n particles relativistic phase space is obtained, where the fundamental role of the symmetrical group is stressed. (Atomindex citation 09:402462)

JINR-R-2-11084 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Definition of Simultaneity and Distance.
V. N. Strel'tsov. 1977, 10p
In Russian.
U.S. Sales Only.

The possibility to formulate a special relativity based on the generalization of the concept of simultaneity has been previously discussed. The indicated generalization practically consists in the substitution, in special Lorentz transformations, of the time coordinate t for the t+(2epsilonsub(0)-1)csup(-1) x, where 0 < epsilonsub(0) < 1 (epsilonsub(0)=1/2 corresponds to the traditional definition of simultaneity). The transformations obtained in such a way (generalized Lorentz transformations) provided the quadratic form invariance rsup(2)=gsub(ik)xsup(i)xsup(k) (i,k=0, 1; x sub 0 =t; x sub 1 =x), where gsub(ik) is a constant metric tensor with components gsub(00)=1, gsub(01)=(2epsilonsub(0)-1)csup(-1), gsub(11)=4epsilonsub(0)(epsilonsub(0)-1)csup(-2). The possibility is considered of that in the known formula which defines the distance between points A and B, Xsub(AB)=epsilonsub(1)c(tsub(2)-tsub(1)), where tsub(1) is the time of sending a light signal from A to B and tsub(2) is the time of its return to A after reflecting at B; epsilon sub 1 can be equal to 0 < epsilon sub 1 < 1, not necessarily to 1/2. It is shown that the assumption connected with a possible space anisotropy is inconsistent (if epsilon sub 1 not equal to 1/2) with a necessary condition of the invariance of the light propagation equations. (Atomindex citation 09:392727)

JINR-R-2-11684 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Some Problems of Special Relativity. Relativistic Mechanics.
V. N. Strel'tsov. 1978, 21p
In Russian.
U.S. Sales Only.

The questions concerning the definition of generalized, true mechanical force and force work in special relativity are discussed. It is shown that the use of a 3-force leads to difficulties of the relativistic formulation of statics. Based on a 4-tensor of torque, the problems of equilibrium (e.g., for the Lewis-Tolman right-angled lever) and the dynamics of rigid body are discussed. For a continuous distribution of matter a 4-tensor of second rank of power-force and a 4-tensor of third rank of torque density as well as the Lagrangian covariant function are considered. It is shown that the application of center of mass is highly limited in relativistic mechanics; the notion of center of inertia is used instead of it. (Atomindex citation 10:427747)

JINR-R-5-11705 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Sufficient Conditions for the Existence of a Positive Particle-Like Solution to a Scalar-Field Nonlinear Equation.
I. V. Amirkhanov, E. P. Zhidkov, and G. I. Makarenko. 1978, 16p
In Russian.
U.S. Sales Only.

An investigation of the nonlinear equation d exp 2 Phi(r)/dr exp 2 -(l(l+1)/r exp 2 + nu exp 2) Phi(r)=-A Phi/sup k/(r)/rsup(k-1) for boundary conditions Phi(0)=Phi(+infinity)=0 is performed. The first equation for zero value of parameter l was investigated by many authors before. An arbitrary integer value of l is considered. By means of the variational approach the following main theorem is proved. For any values of parameters A > 0, nu exp 2 >0, = 1,2,3,... the condition 1 > k > 5 is enough for the existence of a positive particle-like solution to the boundary value problem. (Atomindex citation 10:427611)

MPI-PAE/Astro-177 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Physik und Astrophysik, Munich (Germany, F.R.).
Convergent and Asymptotic Iteration Methods in General Relativity.
D. Christendoulou, and B. G. Schmidt. Mar 79, 26p
U.S. Sales Only.

The authors solve the reduced Einstein equation by an iteration scheme. The error of this method is estimated. (Atomindex citation 10:467024)

20K. Solid Mechanics

AD-A086 335/7 PC **A02**/MF **A01**
Washington Univ Seattle Dept of Mechanical Engineering
Influence of Small Scale Yielding on Dynamic Fracture.
Interim rept.,
A. S. Kobayashi, M. Ramulu, and B. S-J Kang. May 80, 21p Rept no. TR-38
Contract N00014-76-C-0060

Dynamic fracture and crack-arrest responses of the well-discussed wedge-loaded rectangular, double cantilever beam (WL-RDCB) specimens machined from a 3.2 mm thick annealed polycarbonate sheet were studied by dynamic photoelasticity and dynamic finite element analysis. A small, but finite plastic yield zone surrounded the propagating crack which resulted in crack velocities, dynamic fracture toughness and crack arrest toughness lower than those observed previously in 6.4 mm thick polycarbonate fracture specimens. (Author)

AD-A086 377/9 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
An Integral Bound on the Strain Energy for the Traction Problem in Nonlinear Elasticity with Small Strains.
Technical summary rept.,
Joseph J. Roseman. Apr 80, 20p Rept no. MRC-TSR-2060
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041
Sponsored in part by Grant DAAG29-76-G-0102.

For the traction boundary value problem in nonlinear elastostatics for a body which is convex in its undeformed reference state and with the assumption of sufficiently small strains (but not necessarily small displacement gradients), an upper bound is obtained for the elastic strain energy in terms of the L sub 2-integral norms of the surface tractions and body forces with the constant depending only upon the ratio of the outer and inner diameters and the physical constants of the material. This result extends previous known results in linear elasticity (infinitesimal displacement gradients) and finite elasticity (small but finite displacement gradients) into the small strain theory of nonlinear elasticity. (Author)

AD-A086 404/1 PC **A04**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB OH
Curing Stress Fields in Involute Exit Cones.
Final rept. 1 Nov 79-15 Feb 80,
N. J. Pagano. Feb 80, 58p Rept no. AFML-TR-79-4191

A procedure is developed for determining the unusual distribution of ply material in an involute exit cone and then it is used in an analysis of the curing stresses in an IUS exit cone billet. The ply pattern analysis produces three Euler angles at each material point that are used to define properties for a finite element model of the billet. Attention is focused on the delamination failure mode observed during post cure and large regions of cross-ply tension are shown to occur during cool down. Comparisons with autopsy data show that the predicted ply fiber distribution is in good agreement with that observed in the IUS billet, while the finite element stress pattern seems to correlate with observed cracking patterns. Finally, a sensitivity study shows a striking dependence of the interlaminar normal stress on the orientation of the ply pattern on the cloth. (Author)

AD-A086 491/8 PC **A08**/MF **A01**
Northwestern Univ Evanston IL Dept of Civil Engineering
The Surface Singularity of Cracks.
Interim rept.,
Zdenek P. Bazant, and Luis F. Estenssoro. Oct 79, 161p 79-10/2515, AFOSR-TR-80-0457
Grant AFOSR-75-2859

Contents: Variational Equation for the Eigenstates; Method of Solution on a Finite Element grid; and Numerical Solutions.

AD-A086 496/7 PC **A03**/MF **A01**
Princeton Univ NJ Dept of Civil and Geological Engineering
Nonlocal Stress Field at Griffith Crack.
Technical rept.,
N. Ari, and A. Cemal Eringen. Jun 80, 29p Rept nos. 80-SM-7, TR-54
Contract N00014-76-C-0240

By means of nonlocal elasticity theory, the Griffith crack problem is solved to determine the state of stress in a plate weakened by a line crack. The maximum stress is found to be finite and occurs away from the crack tip. Cohesive stress is estimated and compared with the calculations based on atomic lattice theory. (Author)

AD-A086 550/1 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Extremum Problems for the Motions of a Billiard Ball. IV. A Higher-Dimensional Analogue of Kepler's Stella Octangula.
Technical summary rept.,
I. J. Schoenberg. May 80, 37p Rept no. MRC-TSR-2071
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041
See also AD-A064 032.

Let us consider a square billiard table gamma 2 = ABCD, and let A'B'C'D' be a concentric square half the size of ABCD. Let alpha, beta, gamma, delta, be the midpoints of the sides of gamma 2. We observe that the path of a billiard ball moving along the sides of the square alpha beta gamma delta does not penetrate inside the square A'B'C'D'. However, it can be shown that the path of any other billiard ball must penetrate into the square A'B'C'D'. By 'any other' we mean (1) That the path is not parallel to any side of gamma 2. (2) That the path is different from alpha beta gamma delta. In the present paper this curious property of plane billiard ball motions is extended to a certain class of skew polytopes in the n-dimensional space R superscript n. These polytopes reduce to plane billiard ball motions if n = 2. If n = 3 the above property of the square alpha beta gamma delta is taken over by Kepler's Stella Octangula. This is an 8-pointed star which is explained in the paper.

AD-A086 671/5 PC **A05**/MF **A01**
Dayton Univ OH Research Inst
A Review of Nonlinear Fracture Mechanics Relative to Fatigue.
Final rept. Sep 78-Sep 79,
T. Weerasooriya, J. P. Gallagher, and H. C. Rhee. 30 Sep 79, 85p UDR-TR-79-90, AFML-TR-79-4196
Contract F33615-78-C-5184

This report reviews currently available parameters, methodology, and data that support further developments in elastic-plastic fracture mechanics (EPFM) technology for modeling fatigue crack growth rate (FCGR) behavior. In general, it can be stated that linearly elastic fracture mechanics (LEFM) parameters can be used to model FCGR behavior except when the zone of cyclic plasticity accompanying the crack process is large with respect to crack length and other structural length parameters. The literature provides two types of EPFM parameters which are available for modeling FCGR behavior when the limitations of LEFM are exceeded: one type is based on the characterization of the intensity of the crack tip stress-strain field, the other is based on the determination of a specific mechanical parameter which is evaluated at a point close to the crack tip. (Author)

AD-A086 722/6 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Structural Fatigue in One-Crack Models with Arbitrary Inspection,
D. G. Ford. Apr 79, 29p Rept no. ARL/STRUC-377

The reliability theory for fatigue lives of one-crack, two-stage models with hijacking has been extended to allow for arbitrary inspection intervals with possible arbitrary renewals. The life distribution is similar with a modified initiation density and the associated moment generating function is formally identical. It is possible to identify an unsteady Markov chain formed by the combined fatigue and inspection process. Two FORTRAN programs have been developed from this formulation, one of which allows for random crack rates and run-time setting of inspections.

AD-A086 724/2 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
New Results on the Vibrating String with a Continuous Obstacle.
Technical summary rept.,
A. Bamberger, and M. Schatzman. May 80, 49p Rept no. MRC-TSR-2073
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041
Sponsored in part by contract F49620-79-C-0128.

We give an explicit formula which describes the solution of the problem of the vibrating string with a plane obstacle. This formula allows us to prove continuous dependence on the data; a regularity result is given. We prove some results on the convergence of the penalized problem, and give a numerical scheme. A few results are given without the requirement that the obstacle be plane. (Author)

N80-27720/5 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
Instructions for the Use of the Civm-Jet 4C Finite-Strain Computer Code to Calculate the Transient Structural Responses of Partial and/or Complete Arbitrarily-Curved Rings Subjected to Fragment Impact.
J. J. A. Rodal, S. E. French, E. A. Witmer, and T. R. Stagliano. Dec 79, 38p NASA-CR-159873, ASTL-MR-154-1
Contract NGR-22-009-339

The CIVM-JET 4C computer program for the 'finite strain' analysis of 2 d transient structural responses of complete or partial rings and beams subjected to fragment impact stored on tape as a series of individual files. Which subroutines are found in these files are described in detail. All references to the CIVM-JET 4C program are made assuming that the user has a copy of NASA CR-134907 (ASRL TR 154-9) which serves as a user's guide to (1) the CIVM-JET 4B computer code and (2) the CIVM-JET 4C computer code 'with the use of the modified input instructions' attached hereto.

SAND-79-1222C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Bias Errors in a Random Vibration Extremal Control Strategy.
D. O. Smallwood, and D. L. Gregory. 1979, 18p CONF-791053-1
Contract EY-76-C-04-0789
Shock and vibration symposium, Colorado Springs, CO, USA, 16 Oct 1979.

The paper discusses the theoretical basis for an extremal control strategy in random vibration testing. It is shown that except for special cases this strategy results in bias errors. Formulas for estimating the bias are given, and methods for minimizing the errors are suggested. It is concluded that a sequential averager should not be used for this control strategy as its use will result in an unknown bias error. (ERA citation 05:001617)

SAND-79-1502C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Some New Developments in Shock Wave Research.
J. R. Asay, and L. C. Chhabildas. 1979, 7p CONF-790709-16
Contract EY-76-C-04-0789
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

Experimental techniques are discussed for studying continuous loading of materials to high dynamic pressures, for estimating shear strength of shock-loaded solids at high pressures, and for generating two-dimensional stress states in plate impact experiments. These methods are useful in a variety of applications involving equation of state, phase transition and shear strength studies in dynamic experiments. (ERA citation 05:001618)

20L. Solid-State Physics

AD-A086 274/8 PC **A02**/MF **A01**
Princeton Univ NJ Dept of Electrical Engineering and Computer Science
Surface Atomic Geometry of Covalently Bonded Semiconductors: InSb(110) and Its Comparison with GaAs(110) and ZnTe(110).
Technical rept.,
C. B. Duke, R. J. Meyer, A. Paton, J. L. Yeh, and J. C. Tsang. 5 Aug 79, 7p Rept no. TR-60-ONR
Contract N00014-75-C-0394, Grant DAAG29-77-G-0116
Pub. in Jnl. of Vacuum Science Technology, v17 n1 p501-505 Jan/Feb 80. Prepared in cooperation with Xerox Webster Research Center, Rochester, NY. Sponsored in part by Grant NSF-ENG75-18529.

No abstract available.

AD-A086 348/0 PC **A04**/MF **A01**
Hebrew Univ Jerusalem (Israel) Dept of Inorganic and Analytical Chemistry
Energy Transfer between Post-Transition Elements & Rare Earths in Oxide & Chalcogenide Glasses.
Final technical rept. 27 Aug 76-27 Aug 79,
Renata Reisfeld. 27 Aug 79, 73p
Grant DA-ERO-76-G-066

Intensity parameters, radiative transition probabilities and non-radiative relaxation of Ho3+ in various tellurite glasses are described. Eigenstates of Tm3+ in an intermediate coupling scheme were obtained by diagonalization of electrostatic matrices of E(1), E(2) and E(3), the configurational parameters alpha and the spin orbit matrix.

AD-A086 400/9 PC **A03**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
Magnetostriction of Rare Earth-Iron Compounds RFe3 and R6Fe23,
R. Abbundi, and A. E. Clark. 1 Apr 80, 32p Rept no. NSWC/WOL/TR-78-88

Previous work on the cubic Laves phase rare earth-Fe2 compounds has shown that these materials possess enormous magnetostriction constants. In some of these compounds this huge strain is even present at room temperature. Both TbFe2 and SmFe2 possess a room temperature magnetostriction true value of Lambda > 2000 ppm. Although the magnetostriction of the RFe2 compounds (R = Sm, Tb, Dy, Ho, Er and Tm) has been extensively studied, little attention has been paid to the magnetostriction of the remaining rare earth-iron intermetallic compounds. Here we report measurements of the magnetostriction of the RFe3 and R6Fe23 compounds from room temperature to 80K. The room temperature magnetostrictions of the R2Fe17 compounds were also investigated. In the rare earth-iron series the Curie temperatures are the highest for the RFe2 compounds (560-710K) and decrease with increasing iron concentration. Just the opposite is true for the rare earth-cobalt and rare earth-nickel series. Mossbauer effect measurements have been reported on the RFe3 series at various temperatures. These results indicate the direction of the magnetization in these compounds. An attempt will be made to correlate the direction of the magnetization with the behavior of the magnetostriction as a function of temperature.

AD-A086 421/5 PC **A04**/MF **A01**
Hughes Research Labs Malibu CA
Characterization and Analysis of Indium-Doped Silicon Extrinsic Detector Material.
Interim rept. no. 3, 1 Jul 78-30 June 79,
James Baukus, and T. McGill. Apr 79, 59p
Contract DAAK70-77-C-0082, ARPA Order-3211

This third report of a two-year program describes progress made in analyzing Si:In detector material. Hall-effect, photoluminescence, and IR measurements were performed to characterize the X level and to determine its nature. (Author)

AD-A086 494/2 PC **A04**/MF **A01**
Advanced Research and Applications Corp Sunnyvale CA
A Study of Low-Temperature Processes in Non-Equilibrium Electronic States.
Final rept. Feb 78-Jan 80,
T. C. Wang, T. J. Magee, J. Peng, and R. A. Armistead. Apr 80, 58p AFOSR-TR-80-0467
Contract F49620-78-C-0010

Primary focus was directed to experimental studies of the electrical behavior of weakly-coupled superconductors. Two types of superconducting devices were used, Josephson tunnel junctions and superconducting thin-film microbridges. The experiments showed that non-equilibrium states created by microwave irradiation and quasiparticle injection will change the current - voltage characteristics of Josephson devices. Experiments were also conducted to determine if the grain size of superconducting niobium (Nb) films could be controlled using scanning laser annealing. Initial (as deposited) grain sizes were dependent upon the deposition technique. Regardless, laser annealing resulted in substantial modifications to the structure of the Nb films. With proper laser annealing techniques, relatively fine-grained polycrystalline films were converted to large polycrystalline grains with an average size of 5 by 10 micrometers. (Author)

AD-A086 551/9 PC **A03**/MF **A01**
California Univ Berkeley Dept of Mechanical Engineering

On the Characterization of Strain-Hardening in Plasticity.
Technical rept.,
J. Casey, and P. M. Naghdi. May 80, 47p Rept no. UCB/AM-80-5
Contract N00014-75-C-0148

In the context of a purely mechanical, rate-type theory of elastic-plastic materials and utilizing a strain space formulation, this paper is concerned mainly with developments pertaining to strain-hardening behavior consisting of three distinct types of material response, namely hardening, softening and perfectly plastic behavior. It is shown that such strain-hardening behavior may be characterized by a rate-independent quotient of quantities occurring in the loading criteria of strain space and the corresponding loading conditions of stress space. With the use of special constitutive equations, the predictive capability of the results obtained are illustrated for strain-hardening response and saturation hardening in a uniaxial tension test.

AD-A086 629/3 PC **A02**/MF **A01**
IBM Research Lab San Jose CA
Optical Line Narrowing by Nuclear Spin Decoupling in Pr3+ :LaF3,
R. M. MacFarlane, C. S. Yannoni, and R. M. Shelby. 29 Oct 79, 6p AFOSR-TR-80-0483
Contract F49620-79-C-0108
Pub. in Optics Communications, v32 n1 p101-104 Jan 80.

No abstract available.

AD-A086 630/1 PC **A02**/MF **A01**
IBM Research Lab San Jose CA
Ultrahigh-Resolution Spectroscopy: Photo Echoes in YA10 sub 3:Pr3+ and LaF sub 3:Pr3+,
R. M. Macfarlane, R. M. Shelby, and R. L. Shoemaker. 27 Aug 79, 7p AFOSR-TR-80-0482
Contract F49620-79-C-0108
Pub. in Physical Review Letters, v43 n23 p1726-1730, 3 Dec 79.

No abstract available.

AD-A086 652/5 PC **A02**/MF **A01**
Marquette Univ Milwaukee WI Dept of Physics
Electrical Characterization of Germanium Implanted Gallium Arsenide.
Final rept. 1 Jun 79-31 May 80,
Frank L. Pedrotti. 2 Jun 80, 8p AFOSR-TR-80-0462
Grant AFOSR-79-0113

The amphoteric electrical properties of germanium single implants into gallium arsenide, and of dual implants of germanium with either gallium or arsenic into gallium arsenide, have been studied. Room temperature implantation was performed for all implanted ions at 120 keV, with doses ranging from 5E12 to 3E15 ions per square centimeter. Implanted samples were annealed with pyrolytic silicon nitride encapsulants at temperatures ranging from 700 to 1000 degrees Celsius. Both p- and n-type layers were observed. Type of conductivity, electrical activation, and carrier mobility were found to depend critically upon ion dose and anneal temperature. The general electrical behavior suggests that in samples of lower dose and anneal temperature, the implanted Ge ions go into As sites preferentially, producing p-type activity, whereas in samples of higher dose and anneal temperature, more Ge ions go into Ga sites, producing n-type activity. Conductivity was found to change from p- to n-type at an intermediate dose of 3E14 ions per square centimeter and at an anneal temperature between 900 and 950 degrees Celsius. It has been determined that additional implantation of As into GaAs:Ge favors Ge occupancy of Ga sites and an enhancement of n-type activity, whereas the additional implantation of Ga encourages Ge occupancy of As sites and an enhancement of p-type activity. Enhancement factors of as much as 8 for p-type activations, and as much as 50 for n-type activations have been measured. (Author)

AD-A086 885/1 PC **A02**/MF **A01**
Northwestern Univ Evanston IL Dept of Physics
Electronic Band Structure and Properties of Alpha-U,
A. J. Freeman, D. D. Koelling, and T. J. Watson Yang. 1979, 3p AFOSR-TR-80-0523
Grant AFOSR-76-2948
Pub. in Jnl. de Physique, v40 n4 pC4-134-C4-135 Apr 79. Prepared in cooperation with Argonne National Lab., IL. and Case Western Reserve Univ., Cleveland, OH. Dept. of Physics.

No abstract available.

CBPF-A0007/78 PC **A02**/MF **A01**
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Temperature Effects in the Valence Fluctuation of Europium Intermetallic Compounds.
O. L. T. de Menezes, A. Troper, and A. A. Gomes. Mar 78, 12p
U.S. Sales Only.

A previously reported model for valence fluctuations in europium compound in order to account for thermal occupation effect. Experimental results are critically discussed and new experiments are suggested. (Atomindex citation 10:427841)

CEA-CONF-4544 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Lab. d'Electronique et de Technologie de l'Informatique.
Differential gamma -Rays Diffractometry: A New Technique to Investigate Ferroelectric - Ferroelastic Crystals in Cyclic Fields.
P. Bastie, J. Bornarel, and F. Lissalde. 1977, 11p CONF-770946-23701977
International meeting on ferroelectricity, Leningrad, USSR, 18 Sep 1977.
U.S. Sales Only.

Using a new very simple and powerful method of gamma -ray differential photometry, the authors have investigated the contribution due to ferroelectric domain wall movements to the dielectric constant in a KDP single crystal. It has been verified that this contribution, called the plateau region, may be explained by a lateral domain wall displacement of the order of 500 lattice cells around the equilibrium point for T=116 K and E=+-58 V/cm. (Atomindex citation 11:503515)

CONF-791112-62 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Structural Defects in Laser- and Electron-Beam Annealed Silicon.
J. Narayan. 1979, 14p
Contract W-7405-ENG-26
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

Laser and electron beam pulses provide almost an ideal source of heat by which thin layers of semiconductors can be rapidly melted and solidified with heating and cooling rates exceeding 10 exp 80 C/sec. Microstructural modifications obtained as a function of laser parameters are examined and it is shown that both laser and electron beam pulses can be used to remove displacement damage, dislocations, dislocation loops and precipitates. Annealing of defects underneath the oxide layers in silicon is possible within a narrow energy window. The formation of cellular structure provides a rather clear evidence of melting which leads to segregation and supercooling, and subsequent cell formation. (ERA citation 05:024374)

CRN-CPR-79-01 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Calculated Temperature Distribution During Laser Annealing in Silicon and Cadmium Telluride.
R. O. Bell, M. Toulemonde, and P. Siffert. 1979, 22p
U.S. Sales Only.

By solution of the time-dependent heat flow equation, the temperature reached by silicon and cadmium telluride surface layers under high-power-density ruby laser pulsed illumination is calculated. The results are presented in directly useful figures allowing the determination of the surface temperature, its evolution towards the bulk as a function of time... In particular, it should be noticed that for a 25ns half power width pulse 0.8 J/cm exp 2 are sufficient to melt the top of an amorphous silicon layer; this value becomes noticeably lower for cadmium telluride. (Atomindex citation 11:503516)

FRNC-TH-757 MF **A01**
Paris-11 Univ., Orsay (France).
Thermal Electron-Phonon Diffusion in Lithium Doped Germanium and Electronic Structure of the Impurity.
A. Adolf. 1977, 97p
In French.These (3e Cycle).
U.S. Sales Only. Microfiche copies only.

A study has been made of the thermal conductivity of Li doped Ge in the concentration area where the impurities are isolated (N<7x10 exp 15 cm exp -3) and for temperatures between 0.4 and 20 exp 0 K. This work is to contribute to the determination of the electronic structure of the fundamental level of Li in the Ge, a level which is still not well known. This work is broken down into three parts: part one devoted to the experimental aspect. A description is given of the principles and the devices for measuring the thermal conductivity between 0.4 and 20 K as well as the atomic scattering methods enabling samples of Li doped Ge to be obtained. Part two leads to the calculation of the electric-phonon diffusion relaxation time. Then the principles of the analysis of the thermal conductivity of pure Ge in the relaxation time approximations are summarized. This is followed by recalling the calculation components of the electronic structure and the wave functions of the donating impurities in the Ge prior to applying this calculation to Li. This section also includes repeats on the electron-phonon coupling in the approximation of deformation potentials and ends with the calculation of the relaxation times to the electron-phonon interactions in both cases of Li (Tsub(d) or Dsub(3d)) symmetry. The thermal conductivity experimental results are presented and analyzed in the second part. (Atomindex citation 11:500718)

GKSS-78/E/12 PC **A02**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.).
Transport of Strontium Through Matrix Graphite at Low Concentrations.
A. Ruckdeschel, and H. Muendner. 1978, 17p
In German.
U.S. Sales Only.

The diffusion of exp 85 Sr from a source (= 0.8 mm) in the middle of a graphite cylinder (= 5 mm) into the shell at temperatures between 950 and 1150 exp 0 C and Sr concentrations in the graphite between 10 exp -6 and exp 1 mu mol/cm exp 3 is investigated. In order to determine the concentration profiles, layers are taken off the graphite cylinder, and the concentration of exp 85 Sr is determined by activity measurement. The findings are evaluated using the relation between Einstein's displacement square and the diffusion coefficient. The results suggest that the diffusion coefficient increases in the given concentration region with about the 4th square root of the concentration. (Atomindex citation 09:407658)

HU-P-132 MF **A01**
Helsinki Univ. (Finland). Dept. of Physics.
SXTDS1, a Computer Program for Calculating the TDS Contamination of Integrated Intensities for Single Crystals.
J. Kurittu, and M. Merisalo. 31 Aug 77, 15p
U.S. Sales Only. Microfiche copies only.

A FORTRAN computer program is described for calculating the correction for anisotropic one-phonon thermal diffuse scattering included in the measured integrated intensities from single crystals of cubic, tetragonal, orthorhombic, hexagonal or trigonal structure. Detailed instructions are given for using the program, together with an example and a complete program listing. (Atomindex citation 11:497530)

IAE-2876 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Effects of Crystalline Electric Field in PrAl sub 2 and CeAl sub 2.
P. A. Alekseev, I. P. Sadikov, I. A. Markova, and O. D. Chistyakov. 1977, 8p
In Russian.
U.S. Sales Only.

The experiments on the inelastic scattering of neutrons are carried out on the polycrystal samples of

PrAl sub 2 , CeAl sub 2 and LaAl sub 2 aimed at the investigation of the c field crystalline electric field effects in the compounds of the light rare earth metals with aluminium (RAl sub 2) of a cubic lattice. The measurements have been made on the time-of-flight spectrometer with cold neutron source at the sample temperature of 90 and 295 K. The average starting neutron energy is Esub(o)=4.9 MeV. In contrast to the earlier investigated compositions of the type RAl sub 3 (R= Ce, Pr, Nd) the obtained spectra for PrAl sub 2 and CeAl sub 2 do not have strongly pronounced peculiarities, connected with the magnetic scattering at the crystalline electric field levels. However the analysis of the angular dependence of the scattering intensity in the PrAl sub 2 spectra shows that rather high degree of the crystalline electric field fission takes place. The possible mechanisms causing disappearance of spectra peaks in the paramagnetic region are discussed. (Atomindex citation 10:427892)

IC-78-89 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Energy Dissipation of Free Exciton Polaritons in Semiconducting Films.
M. De Crescenzi, G. Harbeke, and E Tosatti. Aug 78, 5p
U.S. Sales Only.

The effective (thickness-dependent) light absorption coefficient K(omega ,d) is discussed for thin semiconducting films in the frequency range of free, spatially dispersive exciton polaritons. We find that (i) it oscillates strongly for small film thicknesses; (ii) it exhibits a slanted peak lineshape; (iii) its integrated strength also depends upon the exciton damping and extrapolates to zero for vanishing damping. (Atomindex citation 11:503544)

IFUSP-P-75 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Magnetic Phase Boundaries of NiCl sub 2 6H sub 2 O Near the Bicritical Point.
N. F. Oliveira, Jr., A. Paduan Filho, and S. R. Salinas. 6p
U.S. Sales Only.

Precise determinations of the magnetic phase boundaries near the bicritical point of NiCl sub 2 6H sub 2 O are shown to be in good agreement with the predictions of recent scaling theories. (Atomindex citation 10:428010)

INIS-mf-4313 PC **A04**/MF **A01**
Sao Paulo Univ., Sao Carlos (Brazil). Inst. de Fisica e Quimica.
Influence of Capture Centers in the KI:M exp ++ Crystals Dielectric Relaxation.
S. C. Zilio. 1976, 69p
In Portuguese.Thesis.
U.S. Sales Only.

The dielectric relaxation due to I-V dipoles in KI doped with small amounts of KCl was found to be strongly different than in KI crystals not containing Cl exp - ions. The new relation peak attributed to the presence of the Cl exp - in the close neighborhood of the divalent ion has a relaxation time 10 exp 3 greater than the normal one. A model for the trapping of the divalent ions by the Cl exp - is proposed. The influence of atomic radius of the divalent and the impurity anion is discussed. (Atomindex citation 09:387515)

INIS-mf-4646 PC **A05**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Certain Relations Between Spin Correlation Functions of Ising Models.
R. J. Boel. 1978, 90p
Thesis.
U.S. Sales Only.

Certain relations are studied between spin correlation functions in Ising models. A system of exact algebraic relations is derived for the spin correlation functions on any so-called boundary set of an Ising model on an arbitrary planar graph. For Ising models with pair interactions in zero magnetic field a class of linear combinations of products of two correlation functions is studied. Examples of correlation function identities and inequalities of this type are given. The correlation function identities for Ising models with general interactions are also studied. It is shown that each identity of this form is equivalent to a set of special identities and a necessary and sufficient condition for the validity of such a special identity is derived. (Atomindex citation 10:421764)

INIS-mf-5353 MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Magnetic Measurements on Transition Metal Compounds and Dilute Alloys in High Magnetic Fields.
J. J. Smit. 30 May 79, 132p
U.S. Sales Only. Microfiche copies only.

A number of experiments are described which have in common the application of high magnetic fields to the study of magnetic ordering phenomena at low temperatures. A pulsed-field magnet is used, capable of producing field pulses during a time period of about 20 ms and maximum fields that are in the range of 40-50 Tesla. In some cases additional data have been taken in superconducting magnets with maximum fields up to 11 T. After a description of the experimental equipment a series of measurements on quasi linear chain antiferromagnets is given. Experiments are described on S=1 systems for which the spin-triplet is split up by the crystal field in such a way that the ground state is a nonmagnetic singlet. The upper doublet splits if a field is applied, and if the Zeeman energy is sufficiently strong, one of the doublet levels will cross the singlet-a magnetic ground state results. The magnetization and the field and frequency dependence of the differential susceptibility of these systems have been studied. The crystal field splitting parameter D and the exchange J are determined. Magnetic measurements are presented on compounds in which the magnetic ions form dimeric or tetrameric clusters of spins, the intercluster interactions being very small. The aim of this investigation was to characterize the magnetic behavior of these systems, and to obtain estimates of the antiferromagnetic superexchange interactions. Lastly, a study is reported on three prototype examples of metallic spin glasses. (Atomindex citation 11:495748)

INIS-mf-5354 MF **A01**
Technische Hogeschool, Delft (Netherlands).
Theoretical Study of the Behaviour at Low Temperatures of Magnetic Dipoles on a Lattice.
J. R. Heringa. 6 Jun 79, 104p
U.S. Sales Only. Microfiche copies only.

A study has been made of the magnetic and caloric low-temperature behavior of crystals with magnetic dipole-dipole interactions between the spins. (Atomindex citation 11:495744)

INIS-mf-5418 PC **A07**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Nuclear Magnetic Relaxation in A-15 Compounds in the Normal and Superconducting State.
A. Gevers. 4 Oct 79, 144p
Proefschrift (Dr.).
U.S. Sales Only.

This thesis deals with a nuclear spin relaxation study on A-15 compounds with vanadium as A element. Specially investigated were systems of the Vsub(1-x)Bsub(x) type where the concentration of the B element can be varied across a relatively large concentration range. The intention of this research is to study the influence of the character and the concentration of the B element on the electronic and superconducting properties in the above mentioned types of systems. The nuclear spin-lattice relaxation rate in metals is in first order proportional to the square of the density of states of the conduction electrons at the Fermi level. Because also the superconducting transition temperature Tsub(c) is a function of N(Esub(F)) it is interesting to compare the results of the relaxation measurements with the behaviour of Tsub. (Atomindex citation 11:500788)

INIS-mf-5420 PC **A05**/MF **A01**
Technische Hogeschool, Eindhoven (Netherlands).
Magnetic Properties of CoBr sub 2 .6((1-X)H sub 2 O.XD sub 2 O).
J. P. A. M. Hijmans. 29 May 79, 76p
Proefschrift (Dr.).
U.S. Sales Only.

The magnetic properties of CoBr sub 2 .6H sub 2 O and the anomalous effects upon deuteration have been studied. The experimental techniques employed are described and the high-temperature behaviour of the susceptibility analysed in terms of a crystal-field model combined with a high-temperature expansion for the exchange contribution. The high-temperature behaviour of the specific heat is studied and several kinds of experiments performed in the ordered state below Tsub(N). The XY plane anisotropy is deduced from antiferromagnetic resonance data and attention paid to the spatial dimensionality of the system. A comparison of parameters determined from experiments below and above Tsub(N) is made and the effects of deuteration discussed. (Atomindex citation 11:500809)

INT-109/I PC **A03**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Gamma-Ray Absorption Coefficient of Non-Homogeneous Materials. Part 2. Monte-Carlo Calculations and Experiment.
K. Umiastowski, M. Buniak, J. Gyurcsak, and P. Maloszewski. 1976, 37p
U.S. Sales Only.

Monte-Carlo calculations and experiments performed in order to verify the analytical formulae developed in the first part of the present paper are discussed. The grain size effect parameter R is determined from the measurements and Monte-Carlo calculations of the absorption coefficient of the granular samples. The dependence of parameter R on the dimensionless grain size Y, obtained in this way is compared with the one calculated from the formulae of Part 1. Good agreement is obtained for all results in a broad range of radiation energies (from 17 keV to 1.33 MeV) and grain sizes (from 40 mu m to 4.0 cm). (Atomindex citation 10:438434)

JINR-E-17-11305 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Kramers-Wannier Transform for Z(N) Symmetric Systems.
A. B. Zamolodchikov. 1978, 10p
U.S. Sales Only.

The purpose of the paper is to demonstrate that the models of internal symmetry Z(n) are dual to those of the same symmetry Z(n). Under a special choice of the interaction between spins the duality turns out to be exact, i.e., the Kramers-Wannier symmetry transform reduced to the change in temperature only as in the case of the Ising-like models. (Atomindex citation 10:450331)

LA-UR-80-1005 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Model Valence-Fluctuation Systems: Variational Ground States and Magnetic Responses.
B. H. Brandow. Apr 80, 11p CONF-800417-2
Contract W-7405-ENG-36
European Physicists Society and Swiss National Science Foundation conference, Zurich, Switzerland, 9 Apr 1980.

Variational ground-state wavefunctions are presented and optimized for two model valence-fluctuation systems, based on Anderson lattice Hamiltonians in the U implies infinity limit. Although these wavefunctions are approximate, they are treated in an essentially exact manner. The)f exp 0 , f exp 1 ; n = 1) system has an intuitively reasonable ground-state susceptibility, while the)f exp 1 , f exp 2 ; n = 2) system is found to exhibit an insulating gap. Due to their different crystal symmetries, this gap should be realized in SmB sub 6 but not in SmS. (ERA citation 05:024955)

N80-27451/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Oxidation of Gallium Arsenide in a Plasma Multipole Device. Study of the MOS Structures Obtained.
S. Gourrier, A. Mircea, and F. Simondet. May 80, 58p NASA-TM-75471, LEP-79/62.SME-687-A
Contract NASW-3198

Transl. Into English of "Oxydation de l'Arseniure de Callium Par Plasma en l'Arseniure de Callium Par Plasma en Utilisant in Dispositif Multipolaire. Etude des Structures MOS Obtenues", Rept. Lep-79/62. Sme-687-a and Dgrst-77-7-1638 Limeil-Brevannes, France, Dec. 1978 p 161. Translation Was Announced as N80-11181. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The oxygen plasma oxidation of GaAs was studied in order to obtain extremely high frequency responses with MOS devices. In the multipole system a homogeneous oxygen plasma of high density can easily be obtained in a large volume. This system is thus convenient for the study of plasma oxidation of GaAs. The electrical properties of the MOS diodes obtained in this way are controlled by interface states, located mostly in the upper half of the band gap where densities in the 10 to the 13th power/(sq cm) (eV) range can be estimated. Despite these interface states the possibility of fabricating MOSFET transistors working mostly in the depletion mode for a higher frequency cut-off still exists.

PAEC(D)-76047 PC **A02**/MF **A01**
Philippine Atomic Energy Commission, Diliman, Quezon City.
Study of Radiation-Damage Profile of Boron Implanted Ion in Silicon by Chemical Etching.
J. Piaquet. Sep 76, 9p
U.S. Sales Only.

The feasibility of determining the magnitude of damage created by boron implanted ions in a silicon crystal (III, 5 ohm-cm) by chemical etching is discussed. The result obtained was concentrated in high dose and moderate energy implantation of the experimental range distribution of the as-implanted sample to the theoretical means depth (Rp) to give the position of maximum damage created in silicon. The result obtained at the energy and dose mentioned (100 KeV and 5 x 10 exp 5 atom-km exp 2 respectively) shows a shift of 1000A from the theoretical mean value of maximum boron concentration. A 600A shift of the associate irradiation damage of the depth distribution (as-implanted) 100 KeV boron atoms was reported using silicon crystal of same orientation but the dose employed was an order of magnitude higher. (Atomindex citation 09:405688)

PATENT-4 171 464
Not available NTIS
Department of Energy, Washington, DC.
High Specific Heat Superconducting Composite.
Patent,
W. A. Steyert, Jr. Filed 27 Jun 77, patented 16 Oct 79, 6p PAT-APPL-810 444
Supersedes PAT-APPL-810 444-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A composite superconductor formed from a high specific heat ceramic such as gadolinium oxide or gadolinium-aluminum oxide and a conventional metal conductor such as copper or aluminum are insolubly mixed together to provide adiabatic stability in a superconducting mode of operation. The addition of a few percent of insoluble gadolinium-aluminum oxide power or gadolinium oxide powder to copper, increases the measured specific heat of the composite by one to two orders of magnitude below the 5 exp 0 K level while maintaining the high thermal and electrical conductivity of the conventional metal conductor. 15 claims. (ERA citation 05:029442)

PB80-200397 Not available NTIS
National Bureau of Standards, Washington, DC.
A Polarized LEED Study of Surface Magnetism.
Final rept.,
D. T. Pierce, R. J. Celotta, G.-C. Wang, G. P. Felcher, and S. D. Bader. 1980, 5p
Sponsored in part by Office of Naval Research, Washington, DC., and Department of Energy, Washington, DC.
Pub. in Jnl. Magnetism and Magnetic Materials 15, n18 p1583-1584 1980 (Proc. Int. Conf. on Magnetism, Held at Munich, Germany, F. R. on Sep 3-7, 1979).

The surface magnetization of ferromagnetic Ni(110) has been observed via the use of a spin polarized electron beam. The spin dependence of the scattered electron intensity was measured as a function of external magnetic field strength and temperature.

PCCF-T-78-04 PC **A04**/MF **A01**
Clermont-Ferrand-2 Univ., Aubiere (France). Lab. de Physique Corpusculaire.
Response Calculus in LiF(Mg,Ti) and CaF sub 2 (Mn) Media Thermoluminescence Irradiated by Heavy Ions.
L. Sahraoui. 1978, 68p
In French.
U.S. Sales Only.

Particular effects induced by heavy particles are studied for their very high energy densities delivered under very high power. Experiments are realized on the radiothermoluminescence phenomena and the same time the heavy ions behaviour on matter is theoretically studied. The theoretical evaluation of the signal in thermoluminescence of some media (LiF(Mg,Ti) and CaF sub 2 (Mn)) irradiated by heavy ions is studied and the differences if these same media are irradiated by other particles such as gamma, electrons, etc. are put into evidence. (Atomindex citation 11:495549)

SAND-79-0544C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Frequency Dependence of Hopping Conductivity.
P. M. Richards. 1979, 9p CONF-790538-5
Contract AC04-76DP00789
Fast ion transport in solids-electrode and electrolytes conference, Lake Geneva, WI, USA, 21 May 1979.

The ionic hopping conductivity is shown to have the frequency dependence sigma(omega) = sigma(infinity) - (sigma(infinity)) - sigma(0))/(1 + omega exp 2 tau exp 2) in two simple models: (i) a general two-inequivalent sublattice system with no interactions other than exclusion of double-site occupancy; (ii) a linear chain of equivalent sites with nearest neighbor interactions as well as double-site-occupancy exclusion. The characteristic time tau for frequency dependence can be much shorter than a hopping time tau/sub dc/ inferred from dc conductivity; and sigma(0)/sigma(infinity) increases to unity at high temperatures. These features agree qualitatively with data on Na beta -alumina. (ERA citation 04:044047)

SAND-79-1695C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Hydrogen and Defects in Laser Annealed Amorphous Silicon.
P. S. Peercy, and H. J. Stein. 1979, 6p CONF-791112-37
Contract EY-76-C-04-0789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

Hydrogenated amorphous silicon was crystallized by pulsed laser annealing to yield hydrogenated crystalline silicon. Nuclear reaction analysis was used to measure hydrogen concentrations and depth distributions. Infrared absorption measurements were used to study the chemically bonded hydrogen. The ir measurements also reveal that divacancies may remain in the lightly-damaged underlying crystalline region after annealing with laser energies sufficient to produce recrystallization. Divacancies anneal out by 350 exp 0 C and defect structures in the vicinity of the bonded hydrogen change between 200 to 500 exp 0 C. No evidence for point defects or chemically bonded hydrogen was found after anneals above 500 exp 0 C. (ERA citation 05:007412)

UCID-18242 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Hydrodynamic Modeling of Heated Quartz Crystals.
H. C. Graboske, Jr., and K. L. Wong. 23 Aug 79, 28p
Contract W-7405-ENG-48

In this study quartz crystal detectors subjected to rapid, but extended, irradiative heating were modeled. The study includes a description of the SiO sub 2 equation of state and a discussion of the effects of solid-solid phase transitions. The applicability and adequacy of some hydrodynamic simulation codes and the importance of an accurate equation-of-state representation for studies that model low temperature and multiphase behavior were evaluated. (ERA citation 05:001490)

UCRL-Trans-11492 PC **A03**/MF **A01**
Akademiya Nauk SSSR, Moscow. Inst. Prikladnoi Matematiki.
Solutions to Wave Equations Using an Artificial Viscosity Method.
V. M. Goloviznin, A. A. Samarskii, and A. P. Favorskii. Jun 79, 39p
Contract W-7405-ENG-48
C Preprint No. 70, 1976.

Earlier work on systems of differential-difference and difference equations (DDDE) that model the behavior of an inelastic continuum in the absence of dissipative processes imposed a strong constraint on the class of problems treated by excluding flows with shock waves accompanied by increasing entropy. To lift this constraint some form of artificial viscosity must be introduced. This work treats linear artificial viscosity, which has the property that it does not distort the eigenfunctions of the original DDDE linearized about the equilibrium position. The numerical value of the coefficient in the presence of such artificial viscosity is selected on the basis of the condition of the most rapid attenuation of the high-frequency oscillations defined by the linearized equations. When such artificial viscosity is selected, it proves possible to investigate completely the problem of the stability of linearized systems of equations in two-dimensional Cartesian and cylindrical coordinates in arbitrary (irregular) calculation meshes. The subject is treated under the following headings: original DDDE; artificial viscosity; linearization of the original equations - the acoustic approximation; analysis of the linear approximation for one-dimensional DDDE; analysis of the linear approximation for two-dimensional DDDE; algorithm for finding the optimal coefficient using artificial viscosity; and investigation of the stability of linearized DDDE. The equations solved describe the behavior of noninteracting harmonic and difference oscillators. (ERA citation 05:003862)

UTNL-R-0050 PC **A02**/MF **A01**
Tokyo Univ. (Japan). Nuclear Engineering Research Lab.
Experimental and Theoretical Study on Magnetoelastic Buckling of a Ferromagnetic Cantilever Beam-Plate.
K. Miya, K. Hara, and K. Someya. Nov 77, 23p
U.S. Sales Only.

When a cantilever of magnetically soft material is inserted with its wide face normal to a uniform magnetic field and the magnetic field is increased to a critical value, the cantilever will buckle. The experimental magnetoelastic buckling fields and the theoretical ones differ by a factor of two. A magnetic field distortion near an edge of the specimen is here evaluated based on the finite element method and the results are applied to the experimental results so as to explain the discrepancy between the experiment and the theory. The corrected experimental values are within 15 percent of the theoretical values. The effect of demagnetization on the buckling field is here demonstrated as well as the effect of specimen dimensions. (Atomindex citation 09:405844)

20M. Thermodynamics

AD-A086 379/5 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
How to Homogenize a Nonlinear Diffusion Equation (e.g.) Stefan's Problem.
Technical summary rept.,
Alain Damlamian. Apr 80, 17p Rept no. MRC-TSR-2061
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

This report discusses the homogenization of a Stefan problem (i.e., heat conduction with change

of phase) when the structure is epsilon-periodic and proves that the constitutive laws of the limit medium do not depend upon the boundary conditions and are those of an anisotropically heat conducting medium which undergoes a change of phase at each temperature of change of phase of the original substances.

AD-A086 385/2 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Asymptotic Behaviour of Positive Solutions of Nonlinear Volterra Equations for Heat Flow.
Technical summary rept.,
Ph. Clement, and J. A. Nohel. May 80, 37p Rept no. MRC-TSR-2069
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041
Errata sheet inserted. Sponsored in part by Grant DAAG29-77-G-0004.

This report considers nonlinear heat flow in a homogeneous bar of unit length of a material with memory with the ends of the rod maintained at zero temperature and with the history of temperature prescribed for time t less than or = 0. For such materials the internal energy and heat flux are functionals (rather than functions) of the temperature and of the gradient of temperature respectively. Application of the law of balance of heat leads to a nonlinear Volterra integrodifferential equation, together with appropriate boundary and initial conditions, which model the physical problem. This initial boundary value problem, which cannot be solved explicitly and which is difficult to analyse, can be transformed by standard methods to the general equation (V) given in the Abstract. The resulting kernel b can be expressed in terms of the internal energy and heat flux relaxation functions. These are presumed to be known for the physical problem. The operator A in (V) is a nonlinear differential operator together with boundary conditions, and the forcing term f in (V) depends on the given initial temperature distribution, the given external heat supply, and the given history of temperature.

AD-A086 387/8 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Asympotic Properties of Solutions of Nonlinear Abstract Volterra Equations.
Technical summary rept.,
Ph. Clement, R. C. Maccamy, and J. A. Nohel. May 80, 44p Rept no. MRC-TSR-2070
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by Grants DAAG29-77-G-0004 and NSF-MCS77-01149.

The purpose of this paper is to develop a general theory which gives sufficient conditions in terms of the kernel b, the operator A, and the forcing term f for the solution u of (V) to be bounded on t greater than or = 0 but less than infinity and which further assures that the solution u tends to a limit u sub infinity as t approaches infinity; under certain conditions u sub infinity = 0, under others u sub infinity is the unique solution of an appropriate 'limit equation' associated with (V). As one special case of this theory we give a complete analysis of the boundedness and asymptotic properties of the solution of the above heat flow problem, under physically reasonable assumptions concerning the relaxation functions, the nonlinear operator, the initial temperature distribution, and the external heat supply.

AD-A086 777/0 PC **A05**/MF **A01**
Naval Research Lab Washington DC
Finite Element Modeling for Convection-Diffusion Problems.
Memorandum rept.,
George A. Keramidas. 15 May 80, 81p NRL-MR-4225, AD-E000 466

The scope of this study is to develop the basic equations for deriving a finite element formulation which can be used to solve problems related to convection and diffusion dominated flows. The formulation is based on the introduction of a generalized quantity defined as heat displacement. The governing equation is expressed in terms of this quantity and a variational formulation is developed which leads to an equation similar in form to Lagrange's equation of mechanics. This equation may be solved by any numerical method, though it is of particular interest for application of the finite element method. The developed formulation is used to derive two finite element models for solving convection-diffusion boundary value problems. The performance of the two element models is investigated and numerical results are given for different cases of conversion and diffusion with three types of boundary conditions. The numerical results obtained show not only the efficiency of the numerical models to handle pure convection, pure diffusion and mixed convection-diffusion problems but also good stability and accuracy. The applications of the developed numerical models is not limited to diffusion-convection problems but can also be applied to other types of problems such as mass transfer, hydrodynamics and wave propagation. (Author)

SAND-78-8047 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Comparison of Some Characteristics of Finite Element and Finite Difference Calculations of Transient Thermal Problems.
A. F. Emery, K. Sugihara, and A. T. Jones. Apr 79, 27p
Contract EY-76-C-04-0789

The use of finite elements for short-time transient thermal problems can lead to anomalous temperature overshoot for certain boundary conditions. A typical example of this behavior was studied by using the finite element and finite difference methods. It is shown that the overshoot arises because the element method yields an upper bound to the eigenvalues. Under some conditions, the finite element method can be improved, but in general the overshoot cannot be eliminated. Because the finite difference method yields a lower bound to the eigenvalues, no such overshoot exists, and this method is to be preferred if very short time responses are desired near boundaries which undergo abrupt changes in temperature. (ERA citation 04:039326)

20N. Wave Propagation

AD-A086 508/9 PC **A05**/MF **A01**
Syracuse Univ NY Dept of Electrical and Computer Engineering
Electromagnetic Scattering from a Homogeneous Body of Revolution.
Technical rept.,
Joseph R. Mautz, and Roger F. Harrington. Nov 77, 88p Rept no. TR-77-10
Contracts F19628-76-C-0300, F30602-75-C-0121

This report considers plane-wave scattering by a homogeneous material body of revolution. The problem is formulated in terms of equivalent electric and magnetic currents over the surface which defines the body. Application of the boundary conditions leads to four simultaneous surface integral equations to be satisfied by the two unknown equivalent currents, electric and magnetic. The set of four equations is reduced to a coupled pair of equations by taking linear combinations of the original four equations. Because many pairs of linear combinations are possible, there are many surface integral equation formulations for the problem. Two formulations commonly encountered in the literature are discussed and solved by the method of moments. A general computer program for material bodies of revolution is developed, listed, and documented. Examples of numerical computations are given for dielectric spheres and a finite dielectric cylinder. The computed results for the sphere are compared to the exact series solution obtained by separation of variables. (Author)

AD-A086 590/7 PC **A02**/MF **A01**
Harry Diamond Labs Adelphi MD
Transmission Factor Effects on the Average Forward Range of Compton Electrons.
Technical memo.,
William T. Wyatt, Jr. Jan 80, 12p Rept no. HDL-TM-80-10

Compton electrons generated in air by gamma rays produced by nuclear explosions are known to cause transient electromagnetic fields called the electromagnetic pulse (EMP) or radioflash. The average forward range of the Compton electrons in air is a principal factor governing the strength of the EMP. Previous estimates of the average forward range of Compton electrons were based on an energy-independent electron transmission factor. This investigation uses an energy-independent electron transmission factor to obtain more accurate results. Results from the two methods are in agreement for an incident gamma energy of 1.5 MeV, and disagree by 7 and 10 percent for incident gamma energies of 0.3 and 10.0 MeV, respectively. Simple numerical fits to the new results are included. (Author)

AD-A086 785/3 PC **A12**/MF **A01**
Naval Research Lab Washington DC
Survey of Potential Radio Frequency Interference Sources.
Final rept.,
C. David Crandall. 13 May 80, 255p NRL-MR-4200, AD-E000 465

This report is a survey of the potential Radio Frequency Interference (RFI) sources that are currently affecting the analysis of data from the SEASAT Scanning Multichannel Microwave Radiometer (SMMR) and those sources that could affect the design of the Large Antenna Multichannel Microwave Radiometer (LAMMR) for the National Oceanic Satellite System (NOSS). The SEASAT SMMR survey is limited to the 6.5 to 6.7 GHz channel and to emitters on the West Coast of the United States and Canada where RFI has been encountered. The NOSS LAMMR survey covers all of the potential frequencies of interest; 3.0 to 7.6 GHz, 10.5 to 11.0 GHz, 13.4 to 14.0 GHz, 14.5 to 14.7 GHz, 17.0 to 18.8 GHz, 20.8 to 22.4 GHz, 34.0 to 35.5 GHz, 36.0 to 37.0 Ghz, 76.0 to 77.0 GHz, and 88.0 to 94.0 GHz. Also included are excerpts from the current international frequency allocation tables and excerpts from the U.S. position which was presented at the 1979 World Administration Radio Conference (WARC). (Author)

AD-A086 812/5 PC **A04**/MF **A01**
Dikewood Industries Inc Albuquerque NM
Excitation of the Parallel-Plate Section of a Bounded-Wave EMP Simulator by a Conical Transmission Line.
Final rept.,
J. Lam. May 80, 55p DC-FR-1299-1, AFWL-TR-79-136, AD-E200 517
Contract F29601-78-C-0045

The excitation of a parallel-plate electromagnetic pulse (EMP) simulator by an electromagnetic pulse via a conical transmission line is analyzed. The analysis first establishes an exact formulation of the problem by use of the technique of electric-field integrodifferential equations. It then goes over to a simpler, approximate formulation in the form of an integrodifferential equation for the total longitudinal surface current flowing on the simulator. This equation is further transformed into an integral equation, and the model structure of its solution investigated. A self-consistent method for solving the integral equation is developed. An analytical formula for the current in the transverse-electromagnetic (TEM) mode is thereby obtained. The analysis concludes with a numerical study of the TEM current and its variation with the parameters of the simulator geometry.

AD-A086 813/3 PC **A06**/MF **A01**
Dikewood Industries Inc Albuquerque NM
Discrete and Continuous Spectra of Finite-Width, Parallel-Plate Simulator Fields.
Final rept.,
F. C. Yang. May 80, 108p DC-FR-1299-2, AFWL-TR-79-137, AD-E200 518
Contract F29601-78-C-0045

The discrete (referred as modes) and continuous spectra of finite-width, parallel-plate simulator fields are investigated. Formulas suitable for numerical calculation are obtained for both the transverse-magnetic (TM) and transverse-electric (TE) fields. Numerical results for the propagation constants and the field distributions of the higher order TM modes are presented. It is found that in the working volume of the parallel-plate simulator some of the higher-order TM modes resemble those of a closed waveguide, and the field of the

continuous spectrum decays at least as z-2 for waves propagating along the z-direction.

AD-A086 814/1 PC **A08**/MF **A01**
Dikewood Industries Inc Albuquerque NM
Parallel-Plate Transmission Line Type of EMP Simulators: Systematic Review and Recommendations.
Final rept.,
D. V. Giri, T. K. Liu, F. M. Tesche, and R. W. P. King. May 80, 166p DC-FR-1299-4, AFWL-TR-79-139, AD-E200 520
Contract F29601-78-C-0045
Prepared in cooperation with LuTech, Inc., Albuquerque, NM and Harvard Univ.

This report presents various aspects of the two-parallel-plate transmission line type of EMP simulator. Much of the work is the result of research efforts conducted during the last two decades at the Air Force Weapons Laboratory, and in industries/universities as well. The principal features of individual simulator components are discussed. The report also emphasizes that it is imperative to hybridize our understanding of individual components so that we can draw meaningful conclusions of simulator performance as a whole.

AD-A086 815/8 PC **A03**/MF **A01**
Dikewood Industries Inc Aibuquerque NM
Interaction Between a Parallel-Plate EMP Simulator and a Cylindrical Test Object.
Final rept.,
J. Lam. May 80, 38p DC-FR-1299-3, AFWL-TR-79-138, AD-E200 519
Contract F29601-78-C-0045

The interaction between a bounded-wave EMP simulator and a test object is studied with a geometrical model. The model consists of a finite, open-ended cylinder inside a parallel-plate waveguide. The interaction problem is formulated exactly by means of an integrodifferential equation, which is subsequently reduced to a matrix equation. An approximate analytical solution of the matrix equation is obtained. The singularities of the solution in the complex-frequency plane are investigated. The effects of the simulator/test-object interaction on the pole singularities are numerically evaluated.

AD-A086 837/2 PC **A05**/MF **A01**
Parke Mathematical Labs Inc Carlisle MA
Spectral Analysis of Scintillation Data Taken from an Aircraft. Part I.
Final rept. Oct 76-Oct 79,
Theodore B. Barrett. Feb 80, 83p 0296-1, AFGL-TR-80-0055-PT-1
Contract F19628-76-C-0296

This report provides theoretical background material for the development of a thin phase screen model for radio scintillation. This model is then used to derive an expression for the expected amplitude scintillation spectra (spectral density funciton) which might be observed in a geometry which includes a satellite based transmitter, an aircraft based receiver and a 'thin', intermediate scintillation-producing medium. A computer procedure was developed for testing the model under various geometries and for various parameters describing the 'bulk' properties statistical properties of the medium. In addition to the development of a theoretical model, this report includes material on experimental spectral analysis and, in particular, details on a spectral analysis procedure which was used on amplitude scintillation and data gathered from an aircraft in geomagnetic equatorial regions. (Author)

AD-A086 860/4 PC **A05**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
Singularity Extraction of EMP Response Waveforms by Prony's Method.
Final rept.,
Algis S. Leveckis. May 80, 83p Rept no. NSWC/WOL/TR-77-99

The Singularity Expansion Method has grown from a theoretical idea to a numerical technique that calculates the poles of a given scattering object. It has spawned the study and growth of Prony's method, which calculates the poles of the scattering object, from the scatter field that is in response to an incident electromagnetic wave. Here is presented the results of an attempt to use Prony's method on EMP response waveforms on ships. The technique to acquire the experimental data is detailed; the numerical problem is posed, and the goals are quickly simplified to attempting to find the best curve-fit to the waveform, using complex exponentials, and then hoping to eliminate the curve-fit poles. A method is presented that aids in the 'physical pole' selection process, and explained also is the significance of the right half plane poles in the results. (Author)

21.

PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A086 283/9 PC **A04**/MF **A01**
National Bureau of Standards Washington DC Center for Fire Research
Ignition of a Liquid Fuel under High Intensity Radiation.
Final progress rept. 1 May 77-30 Sep 79,
Takashi Kashiwagi, Howard R. Bauma, and John A. Rockett. Sep 79, 68p AFOSR-TR-80-0476
Grant AFOSR-ISSA-79-0006

This report summarizes progress in the study of ignition of a liquid fuel under high intensity radiation. It describes an experimental study of the key processes during ignition and a theoretical modeling study of part of the phenomena during the ignition period. the experiments were conducted using a CW CO 2 laser with incident fluex from 1000 to 5000 W/cm wq. and n-decane as the flammable liquid. High speed photgraphs of ignition events showed a periodic depression in the decane surface, probably caused by the thrust of the strong decane vapor flux; radial outward motion of the liquid, probably caused by a surface tension, gradient was also observed. The first appearance of flame was in the gas phase well above the surface. The proposed autoignition mechanism of decane by teh C02 laser is the absorption of the incident laser beam by the vapor plume. The effect on ignition of the incident angle of the laser beam with respect to the decane surface was studied from 90 deg to 30 deg. On reducing the incident angle, the ignition delay time becomes longer and the minimum incident flux for ignition increases significantly. A theoretical model describing the flow motion in the gas phase caused by a heated surface was calculated numerically and solved analytically. (Author)

AD-A086 660/8 PC **A04**/MF **A01**
California Univ Berkeley Dept of Mechanical Engineering
Applications of Rayleigh Scattering to Turbulent Flows with Heat Transfer and Combustion.
Final rept. 1 Mar 78-29 Feb 80,
L. Talbot, and F. Robben. 6 May 80, 72p
AFOSR-TR-80-0535
Contract F44620-76-C-0083

Rayleigh scattering has been developed as a diagnostic technique and used in conjunction with Laser Doppler Anemometry to study two reacting flows; the interaction of a Karman vortex street with a flame, and the interaction of grid-produced turbulence with a flame. It was found that one of the dominant effects of heat release and flow dilatation is to decrease turbulent kinetic energy, and to increase the integral scales of the turbulence. Flame holder drag is found to have a major effect on the flow-field behind the flame. The Markstein model for the effect of wrinkling on flame stability appears to be in qualitative agreement with the results of the vortex interaction experiments. (Author)

AD-A086 707/7 PC **A17**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Combustor Modelling.
Conference proceedings.
Feb 80, 382p Rept no. AGARD-CP-275
Resume in French. Presented at the Propulsion and Energetics Panel (B) Specialists' Meeting (54th), DFVLR, Cologne, Germany, 3-5 Oct 79.

Contents: Session I - Survey; Session II - Basic phenomena (part I); Session II - Basic phenomena (part II); Session III - Transient phenomena and instabilities; Session IV - Furnaces and boilers; Session V - Gas turbine combustors and r/h systems.

RD-B-N-4000 PC **A04**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Combustion of Sodium. A Review of Burning Rate Data.
R. N. Newman. Jan 78, 51p
U.S. Sales Only.

The burning rates of sodium in the form of vapour jets, droplets, sprays and unconfined and confined pools have been reviewed. Attention has been paid to assessing the value of models in the various combustion modes. Additional models have been constructed for the descriptions of laminar and turbulent vapour jets, stationary droplets, forced convection over ambient pool fires together with correlations for peak pressures in confined pool environments. Where appropriate experiments with sodium have not been conducted, the likely behaviour is predicted by comparison with the burning of other fuels, particularly in the field of large free ambient fires. Some areas where further knowledge is required are highlighted. (Atomindex citation 09:416737)

SAND-79-8713 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Bifurcation Phenomena in Burner-Stabilized Premixed Flames.
S. B. Margolis. Oct 79, 47p
Contract EY-76-C-04-0789

The one-dimensional stability of an isobaric burner-stabilized premixed flame is investigated for arbitrary Lewis number and stoichiometry in the asymptotic limit of large activation energy. Assuming a one-step irreversible chemical reaction in which fuel and oxidizer react to form a product, a linear stability analysis is used to calculate the neutral stability boundary in Lewis number-activation energy space as a function of incoming flow velocity (or equivalently, the burned temperature). The major result is that although a steady-state adiabatic flame is likely to be stable for typical parameter values, a value of the incoming flow velocity sufficiently less than the adiabatic flame speed is destabilizing to the extent that the unstable region becomes feasible for many flames. Consequently, if all other parameters are fixed, there exists for such flames a critical value of the incoming flow velocity at which the time-asymptotic solution to the time-dependent problem bifurcates from the unique nontrivial steady state solution. Time-oscillating burner-stabilized flames are observable experimentally, and realistic numerical calculations of a fuel-rich H sub 2 /O sub 2 premixed flame are presented which further verify the existence of such time-periodic solutions for sufficiently small incoming flow velocities. 10 figures, 1 table. (ERA citation 05:003475)

STUDSVIK/E4-79/23 PC **A03**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Combustion in a Fast Fluidized Bed.
L. Stroemberg. 6 Apr 79, 29p
In Swedish.
U.S. Sales Only.

An experimental model for combustion in a fast fluidized bed has been constructed. Cold flow experiments for different fuels are also described. Furthermore, properties of flow have been studied as well as heat transfer properties using solid fuels. (ERA citation 05:001671)

21C. Electric Propulsion

N80-27424/4 PC **A05**/MF **A01**
Xerox Electro-Optical Systems, Pasadena, CA.
Inert Gas Ion Thruster Development.
Interim Report, Apr. 1978 - Feb. 1979.
W. D. Ramsey. Mar 80, 99p NASA-CR-159805, XEOS-2372
Contract NAS3-21345

Two 12 cm magneto-electrostatic containment (MESC) ion thrusters were performance mapped with argon and xenon. The first, hexagonal, thruster produced optimixed performance of 48.5to 79 percent argon mass utilization efficiencies at discharge energies of 240 to 425 eV/ion, respectively, Xenon mass utilization efficiencies of 78 to 95 percent were observed at discharge energies of 220 to 290 eV/ion with the same optimized hexagonal thruster. Changes to the cathode baffle reduced the discharge anode potential during xenon operation from approximately 40 volts to about 30 volts. Preliminary tests conducted with the second, hemispherical, MESC thruster showed a nonuniform anode magnetic field adversely affected thruster performance. This performance degradation was partially overcome by changes in the boundary anode placement. Conclusions drawn the hemispherical thruster tests gave insights into the plasma processes in the MESC discharge that will aid in the design of future thrusters.

21D. Fuels

AD-A086 343/1 PC **A05**/MF **A01**
Battelle Columbus Labs OH
Analytical Techniques for Aromatic Components in Aircraft Fuels.
Final rept. 15 Jun 78-30 Jun 79,
J. Scott Warner, and Richard P. Kenan. Oct 79, 87p AFAPL-TR-79-2093
Contract F33615-78-C-2019

An ultraviolet detector was shown to be highly satisfactory for the selective determination of aromatic components in jet fuels. The detector was operated at 208 nm and used with a glass capillary column gas chromatographic system. The detector gave a linear response in the range of interest and could detect individual benzenes and naphthalenes in jet fuels at levels down to 0.1% and 0.02% respectively. a photoionization detector having a 9.5 ev source was found to be not sufficiently selective for aromatic hydrocarbons to be of value for fuel characterization. (Author)

AD-A086 654/1 PC **A03**/MF **A01**
Southwest Research Inst San Antonio TX Army Fuels and Lubricants Research Lab
Determination of Aromaticity of Fuels and Lubricant Basestocks by Ultraviolet Spectroscopy.
Interim rept. Jan 77-Feb 80,
Frank M. Newman, and Marvin K. Greenberg. Feb 80, 26p Rept no. AFLRL-103
Contracts DAAK70-78-C-0001, DAAK70-80-C-0001
Presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (1978), Mar 78.

A rapid and inexpensive ultraviolet spectroscopic method for determining the aromaticity of turbine and diesel fuels and of lubricant basestocks has been developed. The method employs fixed cells of 0.010, 0.10, and 1.00 cm pathlength in which a sample spectrum is obtained in the 190 to 350nm region. Absorbance values at several wavelengths and simple matrix calculations yield weight percent ring carbon in substituted benzenes, napthalenes, and phenanthrenes/anthracenes. The precision and accuracy of the method are good for both standards and fuel blends. The method is currently in use for correlation work in both turbine combustors and diesel engines. A large number of virgin and re-refined lubricant basestocks have been analyzed and the results compared to those from other methods. The UV data are more detailed and are believed to be more reliable and accurate. (Author)

AD-A086 740/8 PC **A05**/MF **A01**
Army Mobility Equipment Research and Development Command Fort Belvoir VA
Gasolines and Engine Oils: Literature Review, New Laboratory Oxidation Method, and Significance of Olefins in Fuel.
Final rept.,
Marjan Kolobielski, and Fred McCaleb. Mar 80, 89p Rept no. MERADCOM-2296

Review of literature on oxidation of gasolines and lubricating engine oils indicated shortcomings in present laboratory bench oxidation and engine tests. These tests are re-examined and their significance and some causes of poor precision are discussed. The newly developed laboratory oxidation method overcomes the shortcomings of the bench tests. The new method consists of oxidizing a liquid sample in an autoclave under oxygen pressure at desired temperature for a determined period of time. A uniform and constant reaction temperature is maintained by stirring both the sample and the heating oil bath. Gasolines rich in reactive olefins were found prone to oxidation. It is predicted that in the future gasolines may contain high percentage of olefins, gum precursors, because of their high blending octane number. Oxidative stability of formulated engine oil does not correlate with base stock oxidative stability or with the oil performance in engine and field tests. The lack of correlation is explained by the fact that the degradation of crankcase oil is caused by several factors, of which oxidation is only one.

AED-Conf-78-155-058 PC **A02**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Freiburg im Breisgau (Germany, F.R.). Inst. fuer Physikalische Weltraumforschung.
Utilization of Solid Fuels with Low Calorific Value for Power Generation in Large Power Plants.
A. Grabowski. 1978, 15p CONF-7804102-26
In German.Systems exhibition energy within the context of the Hannover fair, Hannover, F.R. Germany, 19 Apr 1978.
U.S. Sales Only.

The mean calorific value of the hard coal used in Polish power plants for power generation varies with regard to the reference limiting value of 18,846 kj/kg set in international statistics. The calorific value of the brown coal used for electric power generation has been gradually decreasing, from 8,510 kj/kg in 1970 to 7,873 kj/kg in 1977. These low-grade coals have caused some operating problems in coal handling, and ash removal systems as well as in steam generators and their auxiliary systems. Apart from this, there are environmental problems. The paper gives solutions to the problems named above. (ERA citation 05:002458)

BCRA-52 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Production of Coke in a Laboratory Tubular Furnace.
Aug 78, 20p
U.S. Sales Only.

Work was carried out to develop a small-scale laboratory test for the production of coke possessing physical and chemical properties similar to those of the corresponding coke produced in large-scale coke ovens. The test is ultimately intended to provide information on the behavior of the different petrographic constituents of coal during carbonization. The test is also intended for the study of the chemical, physical and mechanical characteristics of cokes with the aim of providing guidance in relation to the formulation of blend composition and coal preparation conditions for the production of metallurgical coke. The preliminary work, described in this report, on the correlation between the properties of vertical-tube-furnace cokes and those of corresponding large-scale-oven cokes appears promising; however, further work, to establish the precise carbonizing conditions in the vertical-tube furnace, is required before laboratory-scale and large-scale cokes with identical properties can be produced. (ERA citation 05:021567)

BCRA-54 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Simple Volatility Test for Tar Products.
Sep 78, 15p
U.S. Sales Only.

A simple reliable test to assess the volatility of tar products, especially those of low volatility, has been developed. The mass losses produced by heating small samples of tar products in shallow, open dishes on a thermostatic hot-plate are measured after a predetermined period. These are shown to be of good repeatability and not appreciably affected by normal draughts, and offer a means of differentiating between otherwise similar products. The test method which has been developed is an inexpensive and more reliable alternative to distillation tests for low-volatility products such as pitches, pipeline enamels and road tars. Its application to more volatile products is currently under examination. (ERA citation 05:021653)

BCRA-57 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Aspects of Pore-Structure Development During Carbonization of Preoxidized and Preheated Coals.
Nov 78, 15p
U.S. Sales Only.

An investigation was carried out to compare the pore-structure development during carbonization of preoxidized and preheated coals. Coals oxidized in the laboratory at 100 exp 0 C and industrial blends preheated in the Cerchar preheater were carbonized from room temperature in a small oven. The development of the porous structure was monitored by using a microscope to examine sections cut from the center of the carbonized charges after cooling and filling with epoxy resin. The tensile strength of cokes produced from identical charges in a small oven heated from both side-walls was also determined. (1) Oxidation of high volatile coals at 100 exp 0 C leads to cokes with reduced porosity, pore size and pore-wall thickness. Provided the coke was completely fused, discrete linear relationships between the dilatation of the oxidized coal and the porous structure parameters were obtained. (2) A change in the preoxidation time results in little change in the coke's tensile strength if the structure is well fused. The tensile strength diminishes when fusion is incomplete. (3) Cokes from preheated charges of the blends examined had smaller pores, slightly thicker pore walls, lower porosity and higher tensile strength than those of cokes produced under identical conditions from the untreated charges. (4) These differences suggest that treatment of coal in the Cerchar preheater alters the nature of the coal in a way which influences its subsequent carbonization behaviour. (5) The changes in coke pore size and tensile strength resulting from the altered behaviour of the coal after preheating are similar in direction and magnitude to those observed on drying and densifying an untreated coal charge. (6) The differences between the effects of preheating and preoxidation on coke strength and structure are not consistent with the view that oxidation of coal in the preheater plays a dominant role. (ERA citation 05:021568)

BCRA-65 PC **A02**/MF **A01**
British Carbonization Research Association, Chesterfield (England).
Physical Strength Tests on Coke Fed to and Withdrawn from Blast Furnaces.
Apr 79, 17p
U.S. Sales Only.

The complex pattern of the breakage of coke during rotation within a micum drum has been shown to follow closely a single mathematical expression, which may be expressed in a logarithmic or differential form, and consideration has been given to the possible use of one of the coefficients of this expression as a measure of the physical strength of the coke, characterizing the breakage throughout an extended drum-test. The changes in this coefficient have been noted after a number of exercises in which a study was made of coke fed to and withdrawn from blast furnaces. Such coefficient changes, between the values noted for feed and tuyere samples, have been shown to be directly related to changes in a number of chemical and physical properties of the coke, namely ash, iron, sodium, and potassium contents and also true relative density. (ERA citation 05:021654)

BLG-526 PC **A03**/MF **A01**
Centre d'Etude de l'Energie Nucleaire, Brussels (Belgium).
Hydrogen as an Energy Vector.
H. Vandenborre, and L. H. Baetsle. Apr 79, 30p
U.S. Sales Only.

Some aspects of hydrogen as an energy vector complementary to electricity are outlined. Two production methods for hydrogen are described which do not make use of fossil fuels, e.g. the electrochemical and thermochemical split up of water. Afterwards, the storage of hydrogen has been discussed as a gas, a liquid or a metal hydride. Each of these storage possibilities is illustrated with a realization for great and small amounts of hydrogen. Transport, distribution and security of hydrogen are outlined and finally some brief aspects of the hydrogen production economy have been given. (ERA citation 05:002701)

NP-23604(V.B) PC **A08**/MF **A01**
InterGroup Consulting Economists Ltd., Winnipeg (Manitoba).
Liquid Fuels from Renewable Resources: Feasibility Study. Volume B. Conversion Studies.
Mar 78, 162p
U.S. Sales Only.

Volume B reviews the major conversion routes that can be taken to produce liquid fuels (synthetic oils, methanol, ethanol, and hydrogen) from forest, agricultural, and municipal waste. Conversion Route A (hydrogenation/carboxylolysis and pyrolysis) directly produces synthetic oils without providing any intermediate products. The thermochemical processes are characterized by large energy inputs and are suited to relatively dry, cellulosic feedstocks. Conversion Route B (biophotolysis) produces gaseous hydrogen that can be liquefied for use as a fuel. This biological process is characterized by minimal energy inputs, is suited to water-based feedstocks such as algae. Conversion Route C (acid hydrolysis and enzyme hydrolysis) produces ehtanol fuel, is suited to cellulosic feedstocks such as forests, crops, and related municipal wastes. The processes do not require the feedstock-drying normally associated with thermal-chemical processes. This route is also capable of producing byproducts. Conversion Route D (gasification, hydrogasification, hydrogenation/carboxylolysis, anaerobic digestion) can produce synthetic oils and gasoline, and methanol by utilizing a wide variety of wet and dry feedstocks. The conversion routes are discussed in detail in Appendix B.1. Additional appendices cover hydrogen supply systems and costs; the production of methane from waste organic matter; and the criteria of the cost analysis. (ERA citation 04:030545)

NP-23668 PC **A04**/MF **A01**
Maine Office of Energy Resources, Augusta.
Strategic Petroleum Reserves in Maine.
G. Tibbetts. Jul 77, 70p

An evaluation was made to determine if the State of Maine should develop a State petroleum storage reserve to protect its economic and social vitality against future petroleum shortages. The requirements for residual oil are delineated and alternate storage options are described. The adequacy of the National Strategic Petroleum Reserve Program (S.P.R.) as a tool for alleviating shortfalls of residual oils is also examined. It is concluded that the existing National S.P.R. program may be inadequate because of the unavailiability of Caribbean refineries to handle S.P.R. crude, and the effects of the Jones Act on availability of tankers to transport the crude. It is felt that the time lag required to extract, refine, and market this oil in Maine will be too long and the supply mechanism too tenuous to guarantee continuity of supply. (ERA citation 04:035809)

NP-24012 PC **A06**/MF **A01**
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen.
Desulphurization of Bituminous Coal Dust by Fast Degassing and Partial Gasification.
R. Hauk. 21 Jan 78, 116p
In German.Thesis.
U.S. Sales Only.

The desulfurization of a preoxidized gas coal by fast degassing and partial gasification was investigated in two steps. The influence of the reaction temperature time of contact of the coal on desulfurization in the fast degassing step in the fly dust reactor was investigated. Furthermore, the extent to which the presence of hydrogen sulfide inhibits the desulfurization of coal was checked. It is furthermore shown that by partial gasification of the coke resulting from fast degassing, a further desulfurization is possible. The coke was gasified in the trickling cloud as well as in the solid bed. The influence of the grain diameter was investigated. Furthermore, a mathematical model on the gasification of coke in the fly dust reactor was set up based on kinetic measurements. (ERA citation 05:006410)

NP-24137 PC **A11**/MF **A01**
National Board for Science and Technology, Dublin (Ireland).
Retrospective Search on the Biochemical Production of Alcohol Fuels.
Jul 79, 233p
U.S. Sales Only.

This search covers the period 1957 to 1979. The production of alcohol from a wide variety of carbohydrate sources is covered, i.e., sugar sources, starch sources, and cellulose sources. Some general information relating to the bioconversion process and alcohol fuels are also included. (ERA citation 05:008226)

NP-24168 PC **A03**/MF **A01**
Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland).
Storage and Transmission of Secondary Energy.
M. Taube. Sep 79, 27p
U.S. Sales Only.

In the area of the total energy flow, possibilities and limits of shifts in time (storage) and in space (transfer) of secondary energy, i.e., electrical, chemical, and thermal energy are examined and formulated. These shifts are linked to the qualitative conversions of secondary energy. The multiple technological possibilities, the spectrum of governing factors, and the numerous technical and economical parameters show that only a complex optimization is possible. (ERA citation 05:004566)

NP-24193 PC **A09**/MF **A01**
Kaiserslautern Univ. (Germany, F.R.).
Expansion of the Field of Application of Internal Combustion Engines by the Use of Extremely Poor Mixtures with Hydrogen as a Fuel Additive.
W. Jordan. 12 Dec 77, 200p
In German.Thesis.
U.S. Sales Only.

Investigations of the behavior of Otto engines operated with very poor hydrogen/air mixtures show that hydrogen can be used as an additive to improve the combustion of poor fuel/air mixtures in Otto engines. The paper investigates the problem theoretically and experimentally; in particular, it is investigated to what extent process parameters such as efficiency, mean pressure, and pollutant emission are affected by hydrogen additives. (ERA citation 05:007351)

N80-27509/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Use of Petroleum-Based Correlations and Estimation Methods for Synthetic Fuels.
A. C. Antoine. Jun 80, 23p NASA-TM-81533, E-485

Correlations of hydrogen content with aromatics content, heat of combustion, and smoke point are derived for some synthetic fuels prepared from oil and coal syncrudes. Comparing the results of the aromatics content with correlations derived for petroleum fuels shows that the shale-derived fuels fit the petroleum-based correlations, but the coal-derived fuels do not. The correlations derived for heat of combustion and smoke point are comparable to some found for petroleum-based correlations. Calculated values of hydrogen content and of heat of combustion are obtained for the synthetic fuels by use of ASTM estimation methods. Comparisons of the measured and calculated values show biases in the equations that exceed the critical statistics values. Comparison of the measured hydrogen content by the standard ASTM combustion method with that by a nuclear magnetic resonance (NMR) method shows a decided bias. The comparison of the calculated and measured NMR hydrogen contents shows a difference similar to that found with petroleum fuels.

N80-27510/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Advanced Fuel System Technology for Utilizing Broadened Property Aircraft Fuels.
G. M. Reck. Jun 80, 23p NASA-TM-81538, E-492
Proposed for Presentation at 12TH Congr. Of the Intern. Council of the Aeron. Sci., Munich, 13-17 Oct. 1980.

Possible changes in fuel properties are identified based on current trends and projections. The effect of those changes with respect to the aircraft fuel system are examined and some technological approaches to utilizing those fuels are described.

PAT-APPL-6-062 373 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Hydrogen Production by the Decomposition of Water.
Patent Application,
C. M. Hollabaugh, and M. G. Bowman. Filed 31 Jul 79, 24p
Contract W-7405-ENG-36
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A process is described for the production of hydrogen from water by a sulfuric acid process employing electrolysis and thermo-chemical decomposition. The water containing SO sub 2 is electrolyzed to produce H sub 2 at the cathode and to oxidize the SO sub 2 to form H sub 2 SO sub 4 at the anode. After the H sub 2 has been separated, a compound of the type M/sub r/X/sub s/ is added to produce a water insoluble sulfate of M and a water insoluble oxide of the metal in the radical X. In the compound M/sub r/X/sub s/, M is at least one metal selected from the group consisting of Ba exp 2+ , Ca exp 2+ , Sr exp 2+ , La exp 2+ , and Pb exp 2+ ; X is at least one radical selected from the group consisting of molybdate (MoO sub 42-), tungstate (WO sub 42-), and metaborate (BO sub 21-); and r and s are either 1, 2, or 3 depending upon the valence of M and X. The precipitated mixture is filtered and heated to a temperature sufficiently high to form SO sub 3 gas and to reform M/sub r/X/sub s/. The SO sub 3 is dissolved in a small amount of H sub 2 O to produce concentrated H sub 2 SO sub 4 , and the M/sub r/X/sub s/ is recycled to the process. Alternatively, the SO sub 3 gas can be recycled to the beginning of the process to provide a continuous process for the production of H sub 2 in which only water need be added in a substantial amount. (ERA citation 05:028558)

PB80-200744 PC **A03**/MF **A01**
New Zealand Energy Research and Development Committee, Auckland.
Automotive Fuels from Cellulose Materials.
Final rept.,
B. Higginson, and R. H. Thornton. Jan 80, 30p 49,
Also pub. as ISSN-0110-1692.

This investigation showed that it was feasible to link the alcohol fermentation and anaerobic digestion processes into a system for the production of both alcohol and methane from organic substrates. The rate of ethanol production has been determined with respect to cell concentration and yeast recycling has been shown. Ethanol fermentation under reduced pressure has been shown to be feasible and to give higher ethanol productivities. The fermentation spent wash and extracted crop residues could be anaerobically digested to produce methane (and carbon dioxide). The methane produced could be used either in-plant for process heat requirements or out-of-plant in local or regional energy schemes.

PB80-201114 PC **A02**/MF **A01**
National Alcohol Fuels Commission, Washington, DC.

Legislative Review (1979). 96th Congress, First Session. Alcohol Fuels Tax Incentives. A Summary: Alcohol Fuels Provisions of the Crude Oil Windfall Profit Tax Act.
Jan 80, 21p NAFC/80-01

This report contains a description of the significant legislative actions and bills on alcohol fuels in the Congress during 1979.

PB80-201577 PC **A05**/MF **A01**
Missouri Univ.-Rolla. Dept. of Mechanical Engineering.
Wood Waste as a Power Plant Fuel in the Ozarks.
Final rept.,
V. J. Flanigan. May 80, 88p EPA-600/7-80-103
Grant EPA-R-804270-010

The report discusses the testing program conducted on a chain-grate stoker boiler with a blended coal and wood waste fuel. The boiler was designed to produce 18,000 lb/hr of saturated steam at 150 psig. The objective of the tests was to determine the difference, if any, in the performance and the emissions of the boiler co-firing wood and coal as compared to firing coal alone. Four different coals with different sulfur contents were fired with the wood waste. The wood waste content was varied up to 2/3 by volume.

PB80-202112 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Gasohol: Prospects and Implications.
Agricultural economic rept.,
Ronald Meekhof, Mohinder Gill, and Wallace Tyner. Jun 80, 36p AER-458

The authors of this report address the prospects and implications of gasohol--an alternative fuel partially derived from agriculture. They examine current and proposed legislation (as of March 31), current and near-term ethanol production capacity, the economics of ethanol production, and its impact on the balance of trade and the farm sector. The authors look at many issues of interest to policymakers and the general public.

PB80-207210 PC **A16**/MF **A01**
National Materials Advisory Board (NRC), Washington, DC.
Safety Aspects of Liquefied Natural Gas in the Marine Environment.
Final rept.
Jun 80, 355p NMAB-354
Contract DOT-CG-74248-A

This study evaluates the safety issues associated with the marine transportation, handling, and storage of LNG. The panel concluded that the first concern should be the prevention of an accident that would lead to a large, uncontrolled release of LNG in or near populated areas. This concern was addressed by reviewing the design principles of LNG transportation systems, the operational principles involved in the shipment of LNG, and other factors that might reasonably be expected to improve further the safety of the system. The panel concluded that the second concern was the development of ways to mitigate the consequences of potentially hazardous LNG releases in the event that, contrary to all expectations, measures to maintain tank integrity should fail. Development of these methods requires an understanding of the underlying physical and chemical principles governing large LNG release, including spill dynamics, dispersion on water as well as on land, ignition, and resulting fire and blast effects.

PETC-0212-T1 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Gasification Tests of Bituminous Coal Chars. Project 61023 Final Report, August 1-December 31, 1978.
S. P. Nandi, and S. P. Babu. May 79, 20p
Contract EW-78-C-22-0212

Gasification tests of chars from two samples of bituminous coals (Samples A and B), received from the Pittsburgh Energy Technology Center, were conducted in steam, hydrogen, and a steam/hydrogen mixture (molar ratio of H sub 2 O/H sub 2 = 1) at temperatures from 1600 exp 0 to 1800 exp 0 F and at pressures from 14.6 to 35 atmospheres in a thermobalance to determine their comparative reactivities. The test results were analyzed by two methods - the first developed at the Institute of Gas Technology (IGT) and the second suggested recently by Mahajan, et al. In the IGT method, gasification rate is correlated with two parameters - a surface area term and a surface reactivity term. In the second method, the time required for 50% base carbon conversion, tau sub 0 sub 5 is proposed as a parameter to characterize gasification reactivity. Both methods showed that the reactivity of the chars from Sample B was higher compared to chars from Sample A. Within the constraints of the available data, the higher reactivity of Sample B could be attributed to its lower carbon content and higher ash content as compared to Sample A. In addition, the harder and apparently low-porosity char derived from Sample A, compared to Sample B, could partly explain this difference in reactivity. (ERA citation 05:008027)

PNL-SA-7939 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Investigation of Gasification of Biomass in the Presence of Catalysts.
L. K. Mudge, R. J. Robertus, L. J. Sealock, Jr., D. H. Mitchell, and S. L. Weber. 1979, 34p
Contract EY-76-C-06-1830

The overall objective of this study is to determine the technical and economic feasibility of catalyzed biomass gasification to produce specific products: (a) methane, (b) hydrogen, (c) carbon monoxide, and (d) synthesis gases for generation of ammonia, methanol, or hydrocarbons. Work to achieve the objectives of this study was continued in the laboratory and process development unit (PDU). Laboratory studies further defined the effect of primary catalyst concentration on gasification rate. Systems for direct generation of ammonia synthesis gas and hydrogen were defined at the laboratory scale. No promising system for direct carbon monoxide production was found. A new wood feed system was installed in the PDU and has proved to be reliable and effective for metering wood into the gasifier. New heaters installed in the PDU reactor have greatly improved temperature control in the system. Preliminary calculations on the feasibility of catalyzed gasification of wood to produce methanol are encouraging. Potential methanol yield is about 180 gallons per dry ton of wood. Energy efficiency of the process would be 68%. Details of the results obtained since the last contractors' meeting are presented in the discussion. Status of the project is also presented. (ERA citation 05:006673)

PNL-2989 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Selected Legal and Regulatory Concerns Affecting Domestic Energy Transportation Systems.
C. R. Schuller. Jul 79, 86p
Contract EY-76-C-06-1830

This report provides assessments of eight legal and regulatory concerns that may affect energy material transportation in the US during the rest of the century: state authority to regulate nuclear materials transport, divestiture of petroleum pipelines from major integrated oil companies, problems affecting the natural gas transportation system, capabilities of energy transportation systems during emergencies, Federal coal pipeline legislation, ability of Federal agencies to anticipate railroad difficulties, abandonment of uneconomic railroad lines, and impact of the Panama Canal treaty upon US energy transportation. (ERA citation 05:004567)

SAN-0034-239-1 PC **A11**/MF **A01**
California Univ., Berkeley. Sanitary Engineering Research Lab.
Solar Energy Conversion Through Biophotolysis. Final Report, April 1, 1977-March 31, 1978.
J. R. Benemann, P. C. Hallenbeck, M. A. Murry, L. V. Kochian, and K. Miyamoto. 1 Sep 78, 249p
UCB/SERL-78-8
Contract EY-76-S-03-0034-239

Biophotolysis has been demonstrated using nitrogen-starved cultures of the blue-green alga Anabaena cylindrica. Individual chapters are devoted to: a review of literature on hydrogen from algae; development of the biophotolysis system; thermophilic blue-green algae; characterization and partial purification of the reversible hydrogenase; purification and properties of nitrogenase; studies with an antibody specific to nitrogenase; nitrogenase regulation in Anabaena cylindrica; and hydrogen production with photosynthetic bacteria. (ERA citation 05:008208)

SAN-1338-T1 PC **A11**/MF **A01**
Bechtel National, Inc., San Francisco, CA. Research and Engineering.
Liquefaction Project at Albany, Oregon. Final Technical Progress Report.
Apr 78, 230p
Contract EG-77-C-03-1338

The nation currently faces an ever growing shortage in available energy resources in the areas of liquid and gaseous fuels. To meet growing demands for these fuels, the United States government has embarked on a wide ranging program to develop alternate sources of energy. As part of this program, the US Department of Energy, Solar Energy Division, is developing technologies for the production of gaseous and liquid fuels by the thermochemical conversion of biomass materials. The experiments presently being conducted at the Albany, Oregon test facility are an important part of this program. The Albany facility is a 3 tons per day biomass liquefaction plant designed for the liquefaction of wood and other cellulosic material. The major objectives in the first year's activities at Albany were to verify the original process data, to evaluate the process equipment, and to develop a preliminary conceptual design and economic assessment. This report describes the work performed to achieve these objectives. Section 1 provides a brief background on the liquefaction of biomass. Section 2 provides a summary and conclusion of the findings in this report. Section 3 describes plant commissioning activities including the original process; the commissioning procedure; and the process, equipment, and safety modifications performed. Section 4 discusses process operating results. Section 5 discusses areas needing further study. Development of a commercial process design and economic analysis of the present and future status of the biomass liquefaction concept are described in Section 6. (ERA citation 05:006660)

SAN-1839-T2 PC **A03**/MF **A01**
Teledyne CAE, Toledo, OH.
Gas Turbine Demonstration of Pyrolysis-Derived Fuels. Second Technical Progress Report, April 1-June 30, 1979.
G. Jasas. 1979, 27p
Contract ET-78-C-03-1839

As part of the National Petroleum Conservation effort, a potential non-petroleum base alternate fuel for gas turbines has been identified. The fuel is derived from agricultural and forestry products/wastes through a pyrolysis conversion. Three combustible products are produced - a heavy oil, residual char and gas. Blending of the char and oil products yields a two-phase (slurry) fuel with a heating value that is approximately 85% (volumetric) of typical petroleum base fuels. The work under this contract is directed to evaluate this pyrolysis derived fuel slurry in a direct fired gas turbine application. The report summarizes the work conducted during the months April, May and June under the contract titled, Gas Turbine Demonstration of Pyrolysis-Derived Fuels, No. DE-AC03-78ET-15313. The report structure follows the program's work breakdown structure with progress summarized for the followng active sub-tasks: (1) Program Planning and Fuel Source Selection; (2) Hardware Fabrication and Procurement; and (3) Design and Analysis. (ERA citation 05:000352)

SAND-79-1969 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Catalyst Characterization in Coal Liquefaction. Third Quarterly Report, April 1-June 30, 1979.
M. G. Thomas. Oct 79, 18p
Contract EY-76-C-04-0789

A charge of neutron activated American Cyanamid 1442A CoMo catalyst with total activity of Co exp 60 of approx. 390 mu Ci has been prepared for use in the H-Coal Process Demonstration Unit. Catalysts tested by HRI in (1) a fixed bed with low ash feedstock and (2) an ebullated bed and fixed bed

with higher-ash containing feedstocks corroborate other evidence that the regions of high reflectivity near used catalyst surfaces are due to the pressure of containment mineral matter, primarily iron and titanium. Parametric experiments with coal, preasphaltene, asphaltene, and oil, in tubing reactors, show that production of hydrocarbon gases increases in the series oil < asphaltene < preasphaltene, that both a CoMo catalyst and pyrite addition lowers the production of C sub 1 -C sub 4 hydrocarbons, and that pyrite significantly increases the amount of CO and CO sub 2 generated. (ERA citation 05:002417)

SERI/TP-33-285 PC **A99**/MF **A01**
Solar Energy Research Inst., Golden, CO.
3RD Annual Biomass Energy Systems Conference.
Oct 79, 625p CONF-790638-
Contract EG-77-C-01-4042
Annual biomass energy systems conference, Golden, CO, USA, 5 Jun 1979.

The main objectives of the 3rd Annual Biomass Energy Systems Conference were (1) to review the latest research findings in the clean fuels from biomass field, (2) to summarize the present engineering and economic status of Biomass Energy Systems, (3) to encourage interaction and information exchange among people working or interested in the field, and (4) to identify and discuss existing problems relating to ongoing research and explore opportunities for future research. Abstracts for each paper presented were edited separately. (ERA citation 05:009845)

SIU-IVI-110 PC **A04**/MF **A01**
Sveriges Lantbruksuniversitet, Uppsala. Institutionen foer Virkeslaera.
Conversion Factors Fuelwood: Oil.
M. Nylinder. 1979, 56p

The effective heating value of wood or bark fuels is strongly dependent on the moisture content. The heating value per kg dry wood is about the same for all tree species and tree parts. The effective heating value is about 18 to 13 MJ per kg dry wood at a moisture content (green basis) of 30 to 50%. Because of great variations in basic density for different tree species, the effective heat value varies quite a lot when it is expressed per unit volume. The effective heat value varies from 6 to 9 GJ per m exp 3 solid wood at a moisture content (green basis) of 50 to 30%. The amount of wood at moisture content 40 to 50% which generate the same heating value as one m exp 3 of oil (3 to 5) with regard to efficiency is as follows: Pine - stemwood: 5.8 to 6.5 m exp 3 solid per m exp 3 oil; Pine - residuals: 6.0 to 6.4 m exp 3 solid per m exp 3 oil; Spruce - stemwood: 6.0 to 6.5 m exp 3 solid per m exp 3 oil; Spruce - residuals: 5.1 to 6.1 m exp 3 solid per m exp 3 oil; Birch - stemwood: 4.8 to 5.2 m exp 3 solid per m exp 3 oil; Birch - residuals: 4.8 to 5.2 m exp 3 solid per m exp 3 oil. The conversion factors by weight will for all species be: 2.4 to 2.6 ton (dry matter) per m exp 3 oil : 4.1 to 5.3 ton (green matter) per m exp 3 oil. (ERA citation 05:023837)

SRC-7017-4 PC **A03**/MF **A01**
Synergic Resources Corp., Bala-Cynwyd, PA.
Review of Conversion Technologies for Gulf Coast Lignite.
Apr 79, 29p

This paper briefly describes the current and emerging status of technologies for conversion and utilization of lignite. R and D programs sponsored by the Department of Energy, Electric Power Research Institute, Gas Research Institute and utilities are examined and additional research requirements specific to Gulf Coast lignites are identified. Policy implications for the Ozarks Regional Commission are summarized and specific action items for future research are defined. This paper was prepared in support of the development of the Lignite Research Agenda for the Ozarks Regional Commission. During the development of the Agenda, Synergic Resources Corporation personnel worked in close cooperation with and under the supervision of the Lignite Steering Committee. Members of this Steering Committee included representatives of the local economic development districts, the two state energy offices, state geological surveys and Commission staff. (ERA citation 05:002483)

UCRL-83568 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Studies of Oil-Shale Reaction Chemistry at LLL.
A. K. Burnham. 1 Nov 79, 39p CONF-791209-1
Contract W-7405-ENG-48
Institute of Gas Technology symposium, Atlanta, GA, USA, 3 Dec 1979.

A review is presented of recent studies on the chemistry of oil shale retorting. Kinetics are summarized for oil production and destruction mechanisms including kerogen-bitumen pyrolysis, oil coking and oil cracking. The effect of retorting conditions on shale oil quality is discussed along with the reverse process of inferring retorting conditions and yield loss mechanisms in modified in-situ retorts. Kinetic studies of carbonate mineral decomposition and related mineral reactions as well as residual carbon gasification are outlined. (ERA citation 05:002534)

21E. Jet and Gas Turbine Engines

AD-A086 279/7 PC **A10**/MF **A01**
Pratt and Whitney Aircraft Group West Palm Beach FL Government Products Div
High Energy X-Ray Study.
Final rept. Jan 78-Feb 79,
Malcolm K. Lewis. Jun 80, 210p AEDC-TR-79-53
Contract F40600-78-C-0001
Prepared in cooperation with Lockheed Missiles and Space Corp., Palo Alto, CA and Varian Associates, Inc., Palo Alto, CA.

This study program investigated the feasibility, and developed a conceptual design, for an analytical/diagnostic X-ray system. This system would be used in existing AEDC test cells and would provide a capability to internally examine turbine engines and solid propellant rocket motors while operating under simulated altitude conditions. Diagnostic X-ray capabilities in each Test cell -- J-1/J-2, C-1/C-2, and J-5 -- were studied, and recommendations made. The participating contractors each developed conceptual plans for recommended equipment including the X-ray source, film detector, and positioning components. In addition, test cell environment, portability/survivability, cell modifications, personnel safety/radiation shielding and equipment standardization were studied, and recommendations were made. (Author)

AD-A086 765/5 PC **A07**/MF **A01**
Tennessee Univ Space Inst Tullahoma Dept of Aerospace and Mechanical Engineering
Unsteady Swirling Flows in Gas Turbines.
Annual technical rept. 1 Apr 79-31 Mar 80,
M. Kurosaka. May 80, 126p AFOSR-TR-80-0509
Contract F49620-78-C-0045

The objective of the investigation is to acquire fundamental understanding of a phenomenon characterized by violent fluctuations occurring in swirling air flows in aircraft engines; this flow instability, dubbed here as 'vortex whistle', is known to be capable of causing severe fatigue failure in gas turbine components. in the present report period, the analysis started from the compressible unsteady Navier-Stokes equations; this was necessary in order to assess the importance of the so-called higher order effects in the boundary layer upon the streaming. Resorting to the apparatus of a matched asymptotic expansion, the analytical representation of the acoustic streaming was derived anew. The results are in essential agreement with our previous conclusions and we were able to confirm, on firmer ground, the existence of the threshold swirl beyond which the free vortex distribution changes into a forced vortex type; these are written up in a paper form appended to this report. Second, based upon the analytical results, a test rig with two different tangential injection manifolds was designed, constructed and installed; the acquisition of the data from them will form the central effort of the next, Phase II activity.

AD-A086 795/2 PC **A05**/MF **A01**
United Technologies Research Center East Hartford CT
Two-Phase Nozzle Theory and Parametric Analysis.
Annual technical rept. 15 May 79-14 May 80,
Simion C. Kuo, and Charles W. Deane. Jun 80, 94p Rept no. UTRC/R80-954624-2
Contract N00014-79-C-0344

This study sought to formulate a working theory with which the performance of two-phase nozzles can be analyzed parametrically over a wide range of flow conditions and fluid properties. As a basis for formulating the theory, the technical status of two-phase nozzles was assessed, the governing flow parameters were identified, and the flow domains classified with the previously available theory. A working theory of two-phase nozzles suitable for parametric analyzes and optimization was then formulated, incorporating the significant interphase effects of velocity slip, droplet breakup, and droplet heat transfer. Liquid/gas combinations for two-phase nozzles, and suitable combinations for marine propulsion and other selected applications were discussed. Single-phase (or homogeneous) theory was reviewed from the viewpoints of energy conversion in a nozzle and was compared with models applicable to separate phases in terms of their flow domains. Finally, a working theory of two-phase nozzles was formulated based on the governing flow parameters and on six basic equations that described the two-phase flow. From this theory, a computer model was developed which includes the significant interphase effects of velocity slip, droplet beakup, and heat transfer and which is suitable for parametric analysis and optimization. Preliminary parametric calculations based on use of this model were compared with results from previous two-phase nozzle models and with available experimental data.

AD-A086 843/0 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
The Simulation of Gas Turbines by a State of the Art Analog Device.
Master's thesis,
William Michael Shepherd. 12 May 78, 106p

A simulator was designed to model the operation of a single shaft gas turbine engine. The engine characteristics were represented by a third order non linear mathematical model implemented with analog computation. The use of 'state of the art' integrated circuitry allowed for a considerable reduction in the space and power required for this device compared with conventional analog methods. A hard-wired desk-top machine was fabricated to simulate the real time dynamic behavior of a gas turbine prime mover. (Author)

AD-A086 852/1 PC **A07**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Vibrations of a Compressor Blade with Slip at the Root.
Final rept. Nov 75-Jun 79,
David I. G. Jones. Apr 80, 144p Rept no. AFWAL-TR-80-4003

A simple discrete analytical model is developed to represent the vibration response behavior of a jet engine compressor or turbine blade, primarily in the fundamental mode, allowing for slip at the root. The analysis is compared with experiment, and agreement is found to be satisfactory, indicating that some of the phenomena involved can be modeled in a simple way. (Author)

NP-24108 PC **A07**/MF **A01**
Technische Univ., Hanover (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Theoretical and Experimental Investigation of a Closed Hot-Air Turbine for Operating States Varying with Time.
H. Poesentrup. 25 Jan 78, 129p
In German.Thesis.
U.S. Sales Only.

A theoretical model is developed which takes account of heat exchange between the gas and the enclosing walls. Pipelines and apparatus are modelled by flow channels with a number of subsections. Two flow channels with one common wall represent the heat-exchanging apparatus. Quasistationary behavior of the turbomachinery is assumed. Experiments with the closed hot-air turbine of Energieversorgung Oberhausen AG prove the

reliability of the method of calculation. (ERA citation 05:006817)

N80-27284/2 PC A03/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Cas2d: Fortran Program for Nonrotating Blade-to-Blade, Steady, Potential Transonic Cascade Flows.
D. S. Dulikravich. Jul 80, 36p NASA-TP-1705, E-253

An exact, full-potential-equation (FPE) model for the steady, irrotational, homentropic and homoenergetic flow of a compressible, homocompositional, inviscid fluid through two dimensional planar cascades of airfoils was derived, together with its appropriate boundary conditions. A computer program, CAS2D, was developed that numerically solves an artificially time-dependent form of the actual FPE. The governing equation was discretized by using type-dependent, rotated finite differencing and the finite area technique. The flow field was discretized by providing a boundary-fitted, nonuniform computational mesh. The mesh was generated by using a sequence of conforming mapping, nonorthogonal coordinate stretching, and local, isoparametric, bilinear mapping functions. The discretized form of the FPE was solved iteratively by using successive line overrelaxation. The possible isentropic shocks were correctly captured by adding explicitly an artificial viscosity in a conservative form. In addition, a three-level consecutive, mesh refinement feature makes CAS2D a reliable and fast algorithm for the analysis of transonic, two dimensional cascade flows.

N80-27288/3 PC A13/MF A01
Pennsylvania State Univ., University Park.
Three Dimensional Mean Flow and Turbulence Characteristics of the Near Wake of a Compressor Rotor Blade.
Final Report.
A. Ravindranath, and B. Lakshminarayana. Jun 80, 298p NASA-CR-159518, PSU-TURBO-R-80-4 Grant NSG-3012

The investigation was carried out using the rotating hot wire technique. Measurements were taken inside the end wall boundary layer to discern the effect of annulus and hub wall boundary layer, secondary flow, and tip leakage on the wake structure. Static pressure gradients across the wake were measured using a static stagnation pressure probe insensitive to flow direction changes. The axial and the tangential velocity defects, the radial component of velocity, and turbulence intensities were found to be very large as compared to the near and far wake regions. The radial velocities in the trailing edge region exhibited characteristics prevalent in a trailing vortex system. Flow near the blade tips found to be highly complex due to interaction of the end wall boundary layers, secondary flows, and tip leakage flow with the wake. The streamwise curvature was found to be appreciable near the blade trailing edge. Flow properties in the trailing edge region are quite different compared to that in the near and far wake regions with respect to their decay characteristics, similarity, etc. Fourier decomposition of the rotor wake revealed that for a normalized wake only the first three coefficients are dominant.

N80-27361/8 PC A04/MF A01
Curtiss-Wright Corp., Wood-Ridge, NJ.
Performance, Emissions, and Physical Characteristics of a Rotating Combustion Aircraft Engine, Supplement A.
R. K. Lamping, I. Manning, D. Myers, and B. Tjoa. May 80, 74p NASA-CR-135119, CW-WR-76-028.3
Contract NAS3-20808

Testing was conducted using the basic RC2-75 engine, to which several modifications were incorporated which were designed to reduce the hydrocarbon emissions and reduce the specific fuel consumption. The modifications included close-in surface gap spark plugs, increased compression ratio rotors, and provisions for utilizing either side or peripheral intake ports, or a combination of the two if required. The proposed EPA emissions requirements were met using the normal peripheral porting. The specific fuel economy demonstrated for the modified RC2-75 was 283 g/kW-hr at 75% power and 101 brake mean effective pressure (BMEP) and 272.5 g/kW-hr at 75% power and 111 BMEP. The latter would result from rating the engine for takeoff at 285 hp and 5500 rpm, instead of 6000 rpm.

N80-27362/6 PC A02/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Composite Wall Concept for High Temperature Turbine Shrouds: Heat Transfer Analysis.
F. S. Stepka, and L. P. Ludwig. 1980, 17p NASA-TM-81539, E-402
Presented at Aerospace Congr., Los Angeles, 13-16 Oct. 1980; Sponsored by Soc. Of Automotive Engr.

A heat transfer analysis was made of a composite wall shroud consisting of a ceramic thermal barrier layer bonded to a porous metal layer which, in turn, is bonded to a metal base. The porous metal layer serves to mitigate the strain differences between the ceramic and the metal base. Various combinations of ceramic and porous metal layer thicknesses and of porous metal densities and thermal conductivities were investigated to determine the layer thicknesses required to maintain a limiting temperature in the porous metal layer. Analysis showed that the composite wall offered significant air cooling flow reductions compared to an all impingement air cooled, all metal shroud.

N80-27363/4 PC A02/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Numerical Calculation of Transonic Axial Turbomachinery Flows.
D. S. Dulikravich. 1980, 10p NASA-TM-81544, E-500
Presented at 7TH Intern. Conf. On Numerical Methods in Fluid Dyn., Stanford, Calif., 23-27 Jun. 1980, Sponsored by NASA, AFOSR, NSF, and Onr.

A numerical method and the results of a computer program are presented for solving an exact, three dimensional, full potential equation that models rotating and nonrotating inviscid, absolutely irrotational, homentropic flows. Besides calculating the flows through an arbitrarily shaped rotor or stator blade row mounted on an axisymmetric hub and confined in an axisymmetric duct, the computer program is also capable of analyzing flow fields about arbitrarily shaped wing body combinations, propellers, helicopter rotors in hover, and wind turbine rotors. The governing equation is solved numerically in a fully conservative form by using an artificial time concept, a finite volume technique, rotated type dependent differencing, successive line overrelaxation, and sequential boundary conforming grid refinement. An artificial viscosity is added in fully conservative form, and an initial guess for the potential field is applied, as determined by a two dimensional cascade analysis.

N80-27364/2 PC A13/MF A01
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
CF6-6D Engine Performance Deterioration.
R. H. Wulf, W. H. Kramer, J. E. Pass, and J. J. Smith. Jan 80, 286p NASA-CR-159786, R80AEG218
Contract NAS3-20631

Cruise cockpit recordings and test cell performance data in conjunction with hardware inspection data from airline overhaul shops were analyzed to define the extent and magnitude of performance deterioration of the General Electric CF6-6D model engine. These studies successfully isolated short-term deterioration from the longer term, and defined areas where a significant reduction in aircraft energy requirements for the 1980's can be realized. Unrestored losses which remain after engine refurbishment represent over 70% of the loss at engine shop visit. Sixty-three percent of the unrestored losses are cost-effective to restore which could reduce fuel consumed by CF6-6D engines in 1980 by 10.9 million gallons.

N80-27365/9 PC A02/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Loss Model for off-Design Performance Analysis of Radial Turbines with Pivoting-Vane, Variable-Area Stators.
P. L. Meitner, and A. J. Glassman. 1980, 22p NASA-TM-81532, AVRADCOM-TR-80-C-15
Prepared in Cooperation with Army Aviation Research and Development Command, Cleveland. Preposed for Presentation at the Aerospace Congr., Los Angeles, 13-16 Oct. 1970; Sponsored by the Society of Automotive Engineers.

An off-design performance loss model is developed for variable-area (pivoted vane) radial turbines. The variation in stator loss with stator area is determined by a viscous loss model while the variation in rotor loss due to stator area variation (for no stator end-clearance gap) is determined through analytical matching of experimental data. An incidence loss model is also based on matching of the experimental data. A stator vane end-clearance leakage model is developed and sample calculations are made to show the predicted effects of stator vane end-clearance leakage on performance.

N80-27632/2 PC A03/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Influence of Pressure Driven Secondary Flows on the Behavior of Turbofan Forced Mixers.
B. Anderson, L. Povinelli, and W. Gerstenmaier. Jul 80, 28p NASA-TM-81541, E-493
Presented at 16TH Joint Prop. Conf., Hartford, Conn., 30 Jun. - 2 Jul. 1980; Sponsored by Aiaa, Acme, and Sae.

A finite difference procedure was developed to analyze the three dimensional subsonic turbulent flows in turbofan forced mixer nozzles. The method is based on a decomposition of the velocity field into primary and secondary flow components which are determined by solution of the equations governing primary momentum, secondary vorticity, thermal energy, and continuity. Experimentally, a strong secondary flow pattern was identified which is associated with the radial inflow and outflow characteristics of the core and fan streams and forms a very strong vortex system aligned with the radial interface between the core and fan regions. A procedure was developed to generate a similar generic secondary flow pattern in terms of two constants representing the average radial outflow or inflow in the core and fan streams as a percentage of the local streamwise velocity. This description of the initial secondary flow gave excellent agreement with experimental data. By identifying the nature of large scale secondary flow structure and associating it with characteristic mixer nozzle behavior, it is felt that the cause and effect relationship between lobe design and nozzle performance can be understood.

N80-27696/7 PC A02/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
The Response of Turbine Engine Rotors to Interference Rubs.
A. F. Kascak. 1980, 18p NASA-TM-81518, AVRADCOM-TR-80-C-14
Film Supplement Number C-294 to This Report Is Available on Request from Chief, Management Services Division (5-5), National Aeronautics and Space Administration, Lewis Research Center, 21000 Brookpark Road, Cleveland, Ohio 44135. Presented at Army Sci. Conf., West Point, N. Y., 17-19 Jun. 1980.

A method was developed for the direct integration of a rotor dynamics system experiencing a blade loss induced rotor rub. Both blade loss and rotor rub were simulated on a rotor typical of a small gas turbine. A small change in the coefficient of friction (from 0.1 to 0.2) caused the rotor to change from forward to backward whirl and to theoretically destroy itself in a few rotations. This method provides an analytical capability to study the susceptibility of rotors to rub induced backward whirl problems.

N80-27719/7 PC A02/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Comparison of Elastic and Elastic-Plastic Structural Analyses for Cooled Turbine Blade Airfoils.
A. Kaufman. Jul 80, 15p NASA-TP-1679, E-241

Elastic plastic stress strain states in cooled turbine blade airfoils were calculated by three methods for the initial takeoff transient of an advanced technology aircraft engine. The three analytical methods compared were a three dimensional elastic plastic, finite element analysis, a three dimensional, elastic, finite element analysis, and a one dimensional, elastic plastic, beam theory analysis. Structural analyses were performed for eight cases involving different combinations of mechanical and thermal loading on impingement cooled airfoils with and without leading edge film cooling holes. The von Mises effective total strains at maximum takeoff computed from the elastic and elastic plastic finite element analyses agreed with 9 percent for rotating airfoils and 28 percent for stationary airfoils with the elastic results on the conservative side.

21F. Nuclear Propulsion

INIS-mf-5436 PC **A09**/MF **A01**
Hanover Univ. (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Influence of the Multilayer Method of Construction on the Design of a Reactor Pressure Vessel for a Nuclear Ship.
H. G. Schafstall. 18 Jan 79, 192p
In German.Diss. (D.Eng.).
U.S. Sales Only.

The influence of the material, of the number of layers, of the surface quality of layer sheets, the loads on the core layer and the external layers, and the failure of a layer on the multilayer system were studied under reactor specific conditions. Conclusion are presented. (Atomindex citation 11:505915)

21H. Rocket Motors and Engines

N80-27415/2 PC **A09**/MF **A01**
Remtech, Inc., Huntsville, AL.
Space Shuttle Main Engine Plume Radiation Model.
J. E. Reardon, and Y. C. Lee. Dec 78, 196p
NASA-CR-161498, RTR-014-7
Contract NAS8-29270

The methods are described which are used in predicting the thermal radiation received by space shuttles, from the plumes of the main engines. Radiation to representative surface locations were predicted using the NASA gaseous plume radiation GASRAD program. The plume model is used with the radiative view factor (RAVFAC) program to predict sea level radiation at specified body points. The GASRAD program is described along with the predictions. The RAVFAC model is also discussed.

N80-27423/6 PC **A09**/MF **A01**
Remtech, Inc., Huntsville, AL.
A Computer Program for Thermal Radiation from Gaseous Rocket Exhuast Plumes (GASRAD).
J. E. Reardon, and Y. C. Lee. Dec 79, 183p
NASA-CR-161496, RTR-014-9
Contract NAS8-29270

A computer code is presented for predicting incident thermal radiation from defined plume gas properties in either axisymmetric or cylindrical coordinate systems. The radiation model is a statistical band model for exponential line strength distribution with Lorentz/Doppler line shapes for 5 gaseous species (H2O, CO2, CO, HCl and HF) and an appoximate (non-scattering) treatment of carbon particles. The Curtis-Godson approximation is used for inhomogeneous gases, but a subroutine is available for using Young's intuitive derivative method for H2O with Lorentz line shape and exponentially-tailed-inverse line strength distribution. The geometry model provides integration over a hemisphere with up to 6 individually oriented identical axisymmetric plumes, a single 3-D plume, Shading surfaces may be used in any of 7 shapes, and a conical limit may be defined for the plume to set individual line-of-signt limits. Intermediate coordinate systems may specified to simplify input of plumes and shading surfaces.

21I. Rocket Propellants

AD-A086 534/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Use of Channels with Porous Walls for Studying Flows Which Occur during Combustion of Solid Propellants.
V. I. Yagodkin. 5 Mar 80, 12p Rept no. FTD-ID(RS)T-0323-80
Edited trans. of Proceedings from International Astronautical Federation, International Astronautical Congress (USSR) n18 v3 p69-79 1967, by Martin J. Folan.

No abstract available.

22.

SPACE TECHNOLOGY

22A. Astronautics

N80-27399/8 PC **A06**/MF **A01**
General Dynamics/Convair, San Diego, CA.
Space Construction Automated Fabrication Experiment Definition Study (SCAFEDS), Part 3. Volume 3: Requirements.
Final Report.
29 Jun 79, 115p NASA-CR-160747, CASD-ASP78-016-PT-3-V-3
Contract NAS9-15310

The performance, design and verification requirements for the space Construction Automated Fabrication Experiment (SCAFE) are defined. The SCAFE program defines, develops, and demonstrates the techniques, processes, and equipment required for the automatic fabrication of structural elements in space and for the assembly of such elements into a large, lightweight structure. The program defines a large structural platform to be constructed in orbit using the space shuttle as a launch vehicle and construction base.

N80-27400/4 PC **A14**/MF **A01**
Rockwell International Corp., Downey, CA. Satellite Systems Div.
Space Construction System Analysis Study: Project Systems and Missions Descriptions.
Final Report.
26 Apr 79, 301p NASA-CR-160748, SSD-79-0077
Contract NAS9-15718

Three project systems are defined and summarized. The systems are: (1) a Solar Power Satellite (SPS) Development Flight Test Vehicle configured for fabrication and compatible with solar electric propulsion orbit transfer; (2) an Advanced Communications Platform configured for space fabrication and compatible with low thrust chemical orbit transfer propulsion; and (3) the same Platform, configured to be space erectable but still compatible with low thrust chemical orbit transfer propulsion. These project systems are intended to serve as configuration models for use in detailed analyses of space construction techniques and processes. They represent feasible concepts for real projects; real in the sense that they are realistic contenders on the list of candidate missions currently projected for the national space program. Thus, they represent reasonable configurations upon which to base early studies of alternative space construction processes.

N80-27401/2 PC **A02**/MF **A01**
National Aeronautical Lab., Bangalore (India). Materials Science Div.
Processing of Materials in Space.
S. Ramaseshan Jul 78, 18p ISRO-SN-04-78

The generation of convection flow by gravity and surface tension forces is examined and the advantages of weightlessness processing for materials are discussed with particular attention on electrophoresis, liquid phase miscibility gap, eutectic alloys, crystal growth, and magnetic materials. The use of a molecular shield for producing ultrahigh vacuum over a large volume at an altitude of 200 to 300 km is described. Opportunities provided by space shuttle for spaceborne experiments in these areas are summarized and possible Indian Space program experiments are mentioned.

N80-27402/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Problems and Strategy of the First Flight to the Comets.
V. D. Davydov. Jun 80, 25p NASA-TM-76241, PR-399
Contract NASW-3198
Transl. Into English "Problemy I Strategiya Pervogo Poleta K Komete", Rept. Pr-399 Acad. Of Sci. USSR Inst. Of Space Res., Moscow, 1978 p 1-25. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Substantiation is given for the urgency of using space equipment to study comets in order to work out the basic problem of the origin and evolution of the solar system. The potentialities and advantages of selecting ballistically-accessible objects among the newly discovered comets are shown (as a preliminary study). The technique of early detection of such objects is discussed.

N80-27403/8 PC **A09**/MF **A01**
General Dynamics/Convair, San Diego, CA.
Conceptual Design of Two-Phase Fluid Mechanics and Heat Transfer Facility for Spacelab.
B. F. North, and M. E. Hill. Jun 80, 190p NASA-CR-159810, GDC-CRAD-80-002
Contract NAS3-21750

Five specific experiments were analyzed to provide definition of experiments designed to evaluate two phase fluid behavior in low gravity. The conceptual design represents a fluid mechanics and heat transfer facility for a double rack in Spacelab. The five experiments are two phase flow patterns and pressure drop, flow boiling, liquid reorientation, and interface bubble dynamics. Hardware was sized, instrumentation and data recording requirements defined, and the five experiments were installed as an integrated experimental package. Applicable available hardware was selected in the experiment design and total experiment program costs were defined.

N80-27405/3 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Shuttle Program. STS-7 Conceptual Flight Profile. IUS/TDRS-A.
Jun 79, 110p NASA-TM-81090, JSC-15045
Supersedes Jsc-13968.

The Space Transportation System (STS) Flight Assignment Manifest has has scheduled a Tracking and Data Relay Satellite System (TDRSS) spacecraft for a February 1981 launch on STS Flight 7. The preliminary flight profile that conceptually implements the flight requirements and constraints levied by the STS, inertial upper stage (IUS), and the TDRS spacecraft is presented. The integrated major flight design guidelines and requirements used in the development of the flight profile are included together with a flight sequence of events and time line that describe the profile and reflect implementation of the integrated set of requirements.

N80-27406/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Shuttle Program. STS-7 Feasibility Assessment: IUS/TDRS-A.
Jul 79, 63p NASA-TM-81091, JSC-16026

Supersedes Jsc-14235.

This Space Transportation System 7 (STS-7) Flight Feasibility Assessment (FFA) provides a base from which the various design, operation, and integration elements associated with Tracking and Data Relay Satellite-A can perform mission planning and analysis. The STS-7 FFA identifies conflicts, issues, and concerns associated with the integrated flight design requirements and constraints.

N80-27407/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Shuttle Program. Onorbit Navigation Integrator Results for Typical Shuttle Orbits.
O. W. Olszewski. Jul 79, 40p NASA-TM-81092, JSC-16011

Three types of navigation onorbit numerical integrators were evaluated: (1) power integrators with no delta-V incorporation, just coasting (using Taylor series expansion integrators); (2) coasting integrators using the Cowell method of special perturbations; and (3) coasting integrator using the Pines variation of parameter perturbation method. Results show that the super G integrator is a very simple and effective for 2 and 4 second time steps. Since IMU delta-V data can be easily incorporated in the integration scheme, its use as the standard onorbit navigation propagator for the maintenance of the current state was implemented in the onboard navigation software. The Pines formulation method with a Runge-Kutta-Gill fourth-order integrator method produces excellent results up to 300 second time steps. On orbit prediction with this method was implemented in the onboard onorbit navigation scheme. The Runge-Kutta third order, using Cowell's method, is an excellent general purpose determination integrator for time steps up to a 60 second duration.

N80-27408/7 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Shuttle Program. Mcc Level C Formulation Requirements: Entry Guidance and Entry Autopilot.
J. C. Harpold, and O. Hill. Jan 80, 118p NASA-TM-81093, JSC-11746

A set of preliminary entry guidance and autopilot software formulations is presented for use in the Mission Control Center (MCC) entry processor. These software formulations meet all level B requirements. Revision 2 incorporates the modifications required to functionally simulate optimal TAEM targeting capability (OTT). Implementation of this logic in the MCC must be coordinated with flight software OTT implementation and MCC TAEM guidance OTT. The entry guidance logic is based on the Orbiter avionics entry guidance software. This MCC requirements document contains a definition of coordinate systems, a list of parameter definitions for the software formulations, a description of the entry guidance detailed formulation requirements, a description of the detailed autopilot formulation requirements, a description of the targeting routine, and a set of formulation flow charts.

N80-27409/5 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Shuttle Program. Mcc Level C Formulation Requirements: Shuttle Taem Guidance and Flight Control.
G. L. Carman. Jan 80, 86p NASA-TM-81094, JSC-11786-REV-2
Revised.

The Level C requirements for the shuttle orbiter terminal area energy management (TAEM) guidance and flight control functions to be incorporated into the Mission Control Center entry profile planning processor are defined. This processor will be used for preentry evaluation of the entry through landing maneuvers, and will include a simplified three degree-of-freedom model of the body rotational dynamics that is necessary to account for the effects of attitude response on the trajectory dynamics. This simulation terminates at TAEM-autoland interface.

N80-27410/3 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Shuttle Program: Oft Ascent/Descent Ancillary Data Requirements Document.
A. C. Bond, Jr., and J. Knoedler. Feb 80, 58p NASA-TM-81095, JSC-14C-14370REV-1
Revised.

Requirements are presented for the ascent/descent (A/D) navigation and attitude-dependent ancillary data products to be generated for the space shuttle orbiter in support of the orbital flight test (OFT) flight test requirements, MPAD guidance and navigation performance assessment, and the mission evaluation team. The A/D ancillary data support for OFT mission evaluation activities is confined to providing postflight position, velocity, attitude, and associated navigation and attitude derived parameters for the Orbiter over particular flight phases and time intervals.

N80-27416/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Retrieval Techniques: LVLH and Inertially Stabilized Payloads.
J. A. Yglesias. May 80, 42p NASA-TM-81099, JSC-16425

Procedures and techniques are discussed for retrieving payloads that are inertially or local vertical/local horizontal (LVLH) stabilized. Selection of the retrieval profile to be used depends on several factors: (1) control authority of the payload, (2) payload sensitivity to primary reaction control system (PRCS) plumes, (3) whether the payload is inertially or LVLH stabilized, (4) location of the grapple fixture, and (5) orbiter propellant consumption. The general retrieval profiles recommended are a V-bar approach for payloads that are LVLH or gravity-gradient stabilized, and the V-bar approach with one or two phase flyaround for inertially stabilized payloads. Once the general type of profile has been selected, the detailed retrieval profile and timeline should consider the various guidelines, groundrules, and constraints associated with a particular payload or flight. Reaction control system (RCS) propellant requirements for the recommended profiles range from 200 to 1500 pounds, depending on such factors as braking techniques, flyaround maneuvers (if necessary), and stationkeeping operations. The time required to perform a retrieval (starting from 1000 feet) varies from 20 to 130 minutes, depending on the complexity of the profile. The goals of this project are to develop a profile which ensures mission success; to make the retrieval profiles simple; and to keep the pilot workload to a minimum by making use of the automatic features of the orbiter flight software whenever possible.

N80-27781/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The High Visible Resolution (HVR) Instrument of the Spot Ground Observation Satellite.
G. Otrio. Apr 80, 22p NASA-TM-75830, IAF-79-F-239
Contract NASW-3199
Transl. Into English of Conf. Paper "L'Instrument a Haute Resolution Visible (Hrv) du Satellite d'Observation de la Terre: Spot", Rept. Iaf-79-F-239 Intern. Astronautical Federation, Munich, Sep. 1979 p 1-13. Original Language Document Was Announced as A79-53369. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Two identical high resolution cameras, capable of attaining a track width of 116 km in an almost vertical line of sight from the two 60 km images of each instrument, will be carried on the initial mission of the space observation of Earth satellite (SPOT). Specifications for the instrument, including the telescope and CCD devices are summarized. The present status of development is described including the optical characteristics, structure and thermal control, detector assembly, electronic equipment, and calibration. SPOT mission objectives include the developments relating to soil use, the exploration of EART Earth resources, the discrimination of plant species and cartography.

22B. Spacecraft

AD-A086 709/3 PC **A03**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Requirements, Design and Development of Large Space Antenna Structures.
May 80, 50p Rept no. AGARD-R-676
Presented at the Structures and Materials Panel Meeting (49th), Porz-Wahn, Germany, 7-12 Oct 79.

Contents: Structural Requirements and Constraints of High Gain Satellite Antennas for 30/20 GHz Communications; NASA Technology for Large Space Antennas; Typical Examples of European Technology for High Stability Space Structures. (Author)

AD-A086 779/6 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Radiation Dose in Satellites at 1111 Kilometers with an Inclination of 63 Deg.
Memorandum rept.,
Mary D. Stemple. 16 May 80, 36p NRL-MR-4236, AD-E000 447

A computer program was written to provide a convenient means of calculating the radiation dose received by a satellite in a specified orbit over a given time period. In this case, the orbit is circular at 1111 km altitude, 63 deg inclination. The input data required are tables of annualized orbit-integrated radiation dose vs. shielding thickness (or density) which were obtained from a separate calculation. These were prepared by the National Space Science Data Center, covering the time period from 1981 to 1989, from space environment models AP-8, AE-5, AE-6, AEI-7, and SOLPRO. The radiation dose was calculated using an infinite slab shielding geometry for trapped electrons, bremsstrahlung, trapped protons, and solar protons. A plotting routine for graphing 26 shield thicknesses up to 700 mils of aluminum is provided. Instructions for program execution and data deck setup, samples of the data tables and graphs, and a program listing are included.

N80-27418/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Shape Change of Galileo Probe Models in Free-Flight Tests.
C. Park, and C. F. Derose. Jun 80, 41p NASA-TM-81209, A-8223

Scale models of the Galileo Probe made of polycarbonate, AXF5Q graphite, carbon-carbon composite, and carbon-phenolic were flown in a free flight range in an ambient gas of air, krypton, or xenon. Mach numbers varied between 14 and 24, Reynolds numbers between 300,000 and 1,000,000, stagnation pressures between 31 and 200 atm, and stagnation point heat transfer rates between 10 and 1,000 kW/sq cm. Shadowgraphs indicate gouging ablation of the aft portion of the frustum; the gouging was moderate in air and severe in the noble gases. The graphite models break in the same region. An explanation of the phenomena is offered in terms of the strong compression and shear caused by the reattachment of a turbulent separated flow. Conditions are calculated for similar tests appropriate for Von Karman Facility of the Arnold Engineering Development Center in which a larger model can be flown in argon.

N80-27419/4 PC **A09**/MF **A01**
Howard Univ., Washington, DC. School of Engineering.
The Dynamics and Control of Large Flexible Space Structures, 3. Part a: Shape and Orientation Control of a Platform in Orbit Using Point Actuators.
Final Report.
P. M. Bainum, A. S. S. R. Reddy, R. Krishna, and P. K. James. Jun 80, 179p NASA-CR-163253
Grant NSG-1414

The dynamics, attitude, and shape control of a large thin flexible square platform in orbit are studied. Attitude and shape control are assumed to result from actuators placed perpendicular to the main surface and one edge and their effect on the rigid body and elastic modes is modelled to first

order. The equations of motion are linearized about three different nominal orientations: (1) the platform following the local vertical with its major surface perpendicular to the orbital plane; (2) the platform following the local horizontal with its major surface normal to the local vertical; and (3) the platform following the local vertical with its major surface perpendicular to the orbit normal. The stability of the uncontrolled system is investigated analytically. Once controllability is established for a set of actuator locations, control law development is based on decoupling, pole placement, and linear optimal control theory. Frequencies and elastic modal shape functions are obtained using a finite element computer algorithm, two different approximate analytical methods, and the results of the three methods compared.

N80-27694/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Release Mechanism for Releasing and Reattaching Experiments on the Space Shuttle.
A. V. Clark. Jul 80, 21p NASA-TP-1702, M-301

The release mechanitm (REM) unlatches an experiment so that it can be moved about inside and outside the shuttle bay by the remote manipulator system (RMS), and then reattaches it to the REM base. Operated from the crew compartment after the RMS has been attached to the experiment, the REM releases the experiment by an electric motor driving a gear train and linkage which extracts four pins from holes in four plates. Electrical connectors on the REM are disengaged by the mechanical action of the structural pins retracting from the plates. When the REM releases the experiment, an unlatched indicator is actuated in the crew compartment, and then the experiment can be moved by using the RMS. To reattach the experiment to the REM, the RMS places the experiment with REM attachment angles against the flat, smooth surface of the REM; then the RMS moves the experiment into position for latchup. Actuation of an electric motor drives the four pins into the four holes in the plates. When fully latched, a switch actuated by the motion of the linkage, shuts the electric motor off and gives an indication to the crew compartment that the REM is latched.

22C. Spacecraft Trajectories and Reentry

N80-27411/1 PC **A13**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Sts-1 Operational Flight Profile. Volume 3: Ascent, Cycle 3.
May 80, 300p NASA-TM-81096, JSC-14483-V-3-REV-1
Revised.

The ascent opeational flight profile for the space transportation system 1 flight is designed (1) to limit the maximum undispersed dynamic pressure to 580 lb/sq ft, (2) to follow the design load indicator profiles where q alpha is a specified profile and q beta is desired to be as close to zero as passible, and (3) to maximize nominal and abort performance. Significant trajectory parameters achieved are presented. A maximum dynamic pressure of 575 lb/sq ft was achieved, a minimum q alpha of -2187 lb-deg/sq ft was achieved, and q beta was limited to approximately + or - 100 lb-deg/sq ft in the high q region of the trajectory. The trajectory performance allows a press to main engine cutoff capability with one space shuttle main engine out at 262 seconds ground elapsed time. The orbital maneuvering system burns achieve a final orbit of 150.9 x 149.9 x 149.8 n. mi. and the desired inclination of 40.3 degrees.

N80-27412/9 PC **A15**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Sts-1 Operational Flight Profile. Volume 5: Descent, Cycle 3. Appendix C: Monte Carlo Dispersion Analysis.
Jun 80, 336p NASA-TM-81097, JSC-14483-V-5-REV-1-APP-C
Revised.

The results of three nonlinear the Monte Carlo dispersion analyses for the Space Transportation System 1 Flight (STS-1) Orbiter Descent Operational Flight Profile, Cycle 3 are presented. Fifty randomly selected simulation for the end of mission (EOM) descent, the abort once around (AOA) descent targeted line are steep target line, and the AOA descent targeted to the shallow target line are analyzed. These analyses compare the flight environment with system and operational constraints on the flight environment and in some cases use simplified system models as an aid in assessing the STS-1 descent flight profile. In addition, descent flight envelops are provided as a data base for use by system specialists to determine the flight readiness for STS-1. The results of these dispersion analyses supersede results of the dispersion analysis previously documented.

N80-27413/7 PC **A99**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Sts-1 Operational Flight Profile. Volume 6: Abort Analysis.
Jun 80, 624p NASA-TM-81098, JSC-14483-V-6-REV-1
Revised.

The abort analysis for the cycle 3 Operational Flight Profile (OFP) for the Space Transportation System 1 Flight (STS-1) is defined, superseding the abort analysis previously presented. Included are the flight description, abort analysis summary, flight design groundrules and constraints, initialization information, general abort description and results, abort solid rocket booster and external tank separation and disposal results, abort monitoring displays and discussion on both ground and onboard trajectory monitoring, abort initialization load summary for the onboard computer, list of the key abort powered flight dispersion analysis.

N80-27630/6 PC **A04**/MF **A01**
Remtech, Inc., Huntsville, AL.
SSV Generic OFT First Stage Ascent Base Convective Heating Environments.
R. L. Bender, Jr., and Y. C. Lee. 31 Oct 78, 63p NASA-CR-161499, RTR-014-6
Contract NAS8-29270

Space Shuttle Vehicle (SSV) base convective heating environments during the recirculated flow time segment of first stage ascent were determined for the Generic OFT trajectory and performance conditions. These environments are presented in the attachments as cold wall convective heat transfer coefficients for individual or groups of design points for all affected SSV base surfaces. Two gas recovery temperatures applicable to upper and lower base region surfaces are also included. The environments were based upon magnitudes and trends from analysis of data taken during Base Heating Tests IH-39, IH-75, and IH-83. The plume heating trajectory and performance data were supplied by Rockwell International for both the OFT-1 Generic Mission A and Mission C.

N80-27631/4 PC **A02**/MF **A01**
Remtech, Inc., Huntsville, AL.
Addendum to SSV Generic OFT First Stage Ascent Base Convective Heating Environments.
R. L. Bender, Jr., and Y. C. Lee. 20 Dec 78, 5p NASA-CR-161497, RTR-014-8
Contract NAS8-29270

Convective environments for OFT Mission C are presented in graphs for first stage convective heating to the internal surfaces of the OMS nozzle, to the aft facing 8 and 9 RCS nozzles, and to the base (trailing edge) of the vertical tail.

N80-28096/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
The Primer Vector in Linear, Relative-Motion Equations.
Jan 80, 28p NASA-TM-81111, JSC-16332

Primer vector theory is used in analyzing a set of linear, relative-motion equations - the Clohessy-Wiltshire equations - to determine the criteria and necessary conditions for an optimal, N-impulse trajectory. Since the state vector for these equations is defined in terms of a linear system of ordinary differential equations, all fundamental relations defining the solution of the state and costate equations, and the necessary conditions for optimality, can be expressed in terms of elementary functions. The analysis develops the analytical criteria for improving a solution by (1) moving any dependent or independent variable in the initial and/or final orbit, and (2) adding intermediate impulses. If these criteria are violated, the theory establishes a sufficient number of analytical equations. The subsequent satisfaction of these equations will result in the optimal position vectors and times of an N-impulse trajectory. The solution is examined for the specific boundary conditions of (1) fixed-end conditions, two-impulse, and time-open transfer; (2) an orbit-to-orbit transfer; and (3) a generalized rendezvous problem. A sequence of rendezvous problems is solved to illustrate the analysis and the computational procedure.

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